GENERAL LIBRARY
JUN 15 1920
OF MICH.

PUBLISHED WEEKLY 1920

AMERICAN GAS ENGINEERING JOURNAL

FORMERLY

AMERICAN GAS LIGHT JOURNAL

VOL. CXII, No. 24
WHOLE No. 3249

NEW YORK, SATURDAY, JUNE 12, 1920

Subscription $3 per year
$4 Canada $5 Foreign

KOPPERS

Chamber Retort Ovens

heated either with Coke Oven Gas or Producer Gas provide the most efficient and flexible method of manufacturing gas for companies with outputs of 500,000 cu. ft. daily and larger.

THE KOPPERS COMPANY

PITTSBURGH, PA.

Designers and Builders of By-Product Gas Plants

INDEX TO CONTENTS, PAGE 469

ADVERTISERS' INDEX, PAGE 24

The Test of Good Service

Take a house with a Kompak Automatic Storage Water Heater.

Get out your stop watch.

Open the cold water faucet wide and note time it takes to fill the tub.

Empty the tub.

Now open the hot water faucet wide and note the time it takes to fill the tub. You will find that you have drawn

Hot Water as Fast as the Cold

that is one of the many meritorious features of Kompak Automatic Storage Water Heaters.

Better Order Now

M106

AMERICAN GAS ENGINEERING JOURNAL. June 12, 1920. Vol. CXII, No. 24. Published Weekly by American Gas Light Journal, Inc., New York, N. Y. Subscription Price $3 per Year; $4 Canada; $5 Foreign.
Entered as second-class matter January 9, 1917, at the post-office at New York, N. Y., under the Act of March 3, 1879.

American
Gas Engineering Journal

FORMERLY THE AMERICAN GAS LIGHT JOURNAL

Vol. CXII, No. 24 NEW YORK, JUNE 12, 1920 Whole No. 3249

Gas as Used in Feather Gilding—Silvering and Kindred Processes

Picture Gilding a Field of High Possible Value to Gas Man—Where Heat is Used in Making Gold Signs—Water Gilding on Silver

By GILBERT C. SHADWELL

Feather gilding is largely used in book work, albums, etc. To ornament the side of an album, for example, they finely powder some resin and dust it over the surface of the leather, then the leaf is laid on and the letters or impression it is desired to transfer are applied hot. After this the loose metal is dusted off with a cloth. As an alternative the cover is first washed with clear gum water. The parts to be gilded are then coated twice with white of egg, beaten into a froth and allowed to subside into a clear liquid. A little ammonia is sometimes added. To gild they spread a leaf of gold on the gilding cushion with a knife and blow it flat. It is then cut into strips about one inch wide. The tool is then heated until it is just hot enough to fizz under the wet finger. If it splutters it is too hot, and it will burn the leather; it is best to tough its edge with a rag slightly moistened with sweet oil and with the same rag rub over the part of the book to be gilded. Roll the tool softly on the strips of gold which will adhere to it and when enough is taken up roll it with a heavier pressure along the places to be gilded, and the gold will be transferred to the leather, the excess being wiped away with a soft rag.

Mercury Gilding

We have already made brief mention of mercury gilding. As it embodies the use of gas to a considerable extent it will be now considered in greater detail. To prepare the amalgam of gold for the purpose of mercury gilding, a weighed quantity of fine gold (Standard gold) is first put in a crucible and heated to dull redness. The requisite proportions of mercury 8 parts to 1 part of gold is now added and the mixture is stirred with a slightly crooked iron rod, the heat being kept up until the gold is entirely discolored by the mercury. They then pour the amalgam into a small dish, about 3 parts filled with water and work about with the fingers under the water to squeeze out as much of the excess of mercury as possible. To facilitate this, the dish is slightly inclined to allow the superfluous mercury to flow from the mass, which soon acquires a pasty condition, capable of receiving the impression of the fingers. Afterwards the amalgam is squeezed in a chamois leather bag, by which a further quantity of mercury is liberated; the amalgam which remains after this final treatment consists of almost 33 parts of mercury and 57 parts of gold in 100 parts. The mercury which is pressed through the bag retains a good deal of gold, and is employed in preparing first batch of Amalgam. It is important that the mercury employed should be quite pure.

To apply the amalgam a solution of nitrate of mercury is employed. This is prepared by dissolving in a glass flask 100 parts of mercury in 110 parts of nitric acid, of specific gravity 133. Gentle heat from a Bunsen burner is employed to assist the chemical action. The red fumes given off must be allowed to escape into a chimney since they are very poisonous. When the mercury is all dissolved, the solution is to be diluted with about 25 times its weight of distilled water and bottled for use.

Applying the Amalgam—In applying the amalgam, the pasty material is spread with the blade of a knife upon a hard flat stone. The article after being well cleaned and scratch-brushed is treated in the following way: They take a small scratch-brush formed of stout brass wire, dip it in the solution of nitrate of mercury and then draw it over the amalgam. The brush is then passed carefully over the surface to be gilded, repeatedly dipping the brush in the mercurial solution and drawing it over the amalgam until the entire surface is uniformly and sufficiently coated. The article is then well rinsed and dried. The next operation is the evaporation of the mercury. For this purpose it used to be the practise to make a charcoal fire resting upon a cast iron plate, a simple hood of sheet iron, being the only means of protection from the injurious effects of the mercurial vapors. A gas-heated equipment in

the form of stove-burner conveniently situated can be made and gas men will do well to bear this in mind because the old method lingers in a number of places.

When the amalgamed article is mixed and dried it is exposed to the heat, turned about and heated by degrees to the proper point. Then it is withdrawn from the heat by means of pincers or tongs. The article is then taken in the left hand which should be protected by a leather glove, turned over the flame in every direction and while the mercury is volatilizing, the article should be struck with a long haired brush in order to equalize the amalgam coating and force it upon such parts as may appear to require it. When the mercury has become entirely volatilized the gilding has a dull greenish yellow color. If any bare places are apparent they are touched up with amalgam and the article again submitted to the heat, care being taken to expel the mercury gradually. The article is then well scratch-brushed; when it is of a pale greenish color, heat it again to expel any remaining mercury, when it acquires the orange-yellow of fine gold.

Gilding Metal

The metal employed for gilding is usually brass or a mixture of brass and copper.

1. Copper, 6 parts; brass, 1 part.
2. Copper, 4 parts; Bristol brass, 1 part.
3. Copper, 13 parts; old Bristol brass, 3 parts; tin, 14 parts.

Mixtures employed in gilding by fire or by the wet processes are as follows: Red ormolu, potash alum, nitrate of potash, 30 parts of each; sudphate of zinc, 8 parts; common salt, 3 parts; red ocher, 28 parts; sulphate of iron, 1 part; they usually add to it a small proportion of annatto, madder, cochineal, or other coloring matter, ground in water or in weak vinegar.

Yellow Ormolu—Red ocher, 17 parts; potash alum, 50 parts; sulphate of zinc, 10 parts; common salt, 3 parts; nitrate of potash, 20 parts.

Dead Luster for Jewelry—Sulphate of iron, sulphate of zinc, potash alum, nitrate of potash, equal parts of each. All the salts are melted in their water of crystallization.

Hard Dead Luster for Clocks—Water, 5 parts; nitrate of potash, 37 parts; potash alum, 42 parts; common salt, 12 parts; pulverized glass and sulphate of lime, 4 parts. The whole is thoroughly grounded and mixed.

Soft Dead Luster for Smooth Surfaces and Figures—Water, 5 parts; nitrate of potash, 46 parts; common salt, 3 parts. This is treated as the hard dead luster above.

Green or Red Luster—Bitartrate of potash, 65 parts; common salt, 5 parts; acetate of copper, 10 parts. The whole is ground together.

Wax for Gilding—Oil, 25 parts; yellow wax, 25 parts; acetate of copper, 13 parts; red ocher, 13 parts. The whole is melted and stirred until cold.

Applying Gold Leaves to Paper—Glair, which is pure albumin, is sometimes used for this purpose. It is made by shaking up the white of an egg with a few drops of ammonia, drawing off the clear liquid that has subsided on standing. This is painted on the lines to be covered; and by slight heat, as, for instance, of a gas iron just warm, the leaf adheres. Gold size is used on thick paper, or thick gum arabic water may be used.

The illuminators of to-day cannot get as good results as did the old workers of the middle ages. The old gilding is never equaled now.

Oil Gilding

This species of gilding may be divided into several operations:

1. The surface is prepared by a coating of whitelead in drying oil.
2. Another coat is given made with calcined whitelead or Masiscot ground in linseed oil and turpentine; three or four coats of the mixture are often given, observing to carefully smooth off each coat with pumice or grass before the application of the following ones.
3. The gold color or paint is next applied. It is usually very adhesive gold size, as the bottom of the pot or dish in which painters wash their brushes. For this purpose it is thoroughly ground and strained.
4. When the gold color becomes partially dry and sufficiently tenacious, the gold leaf is applied and pressed on with a wad of cotton, wool or soft brush.

The following description of picture frame gilding is given to the gas men because the subject is one which it is believed few have studied, and the writer feels that this is a field which has scarcely been touched. The value of the industry to the gas man will not be dreamed. Some of the data given is taken from "Workshop Receipts."

Suppose that we have a plain picture frame; it is made by the joiner into a 12-ft. length of molding, and in that state it passes into the hands of the gilder. He first heats up a priming of size and whiting, called thin white, and applies it. This heating can readily be done on a good industrial stove. The whiting employed by the gilder is not the same as that used for domestic purposes, but is finer and far more free from grit. The size employed is prepared by the gilder from parchment cuttings or glove cuttings. The cuttings are well washed in water, and then boiled in a certain quantity of clean water (in a cauldron or tank furnace, if the gas man is on the job) until the water has a particular degree of adhesiveness, which can only be determined by experience. This is then poured off into a clean vessel and allowed to cool. When about to be used the grease at the top and the sediment at the bottom are cut off with a knife, the size is melted in an earthenware pipkin, and a small quantity of finely powdered whiting is mixed with it. When the thin white is dry, all holes and irregularities in the molding are filled up with putty. This putty is not the same as that employed by the glazier but consists of whiting and size mixed to the consistency of putty. When the puttying is dry a coating of thick white is laid on with a brush. This thick white differs from the thin white only in having a larger proportion of dry whiting mixed with a given amount of size, the consistency attained being rather thicker than that of oil paint. When the first thick white is dry another is laid on in the same manner, and similarly a third, a fourth or fifth is laid on, all about equal in thickness and each one being perfectly dry before the next is applied. As in laying on this large body of white the fine squares, hollows and fillets would be liable to be stopped up and lose all their clearness and sharpness, opening tools consisting of crooks, chisels and gouges are drawn along the fine parts of the molding while the thick white is still wet,

by which means the forms of various moldings are retained. This is still better effected by the double opening white, which consists of two thick whites, the one laid on almost immediately after the other, by which a thick soft coating covers the molding. Hard stones shaped to the form of the moldings, together with the opening tools before described, are to be worked over every part of the molding, by which asperities are smoothed down, depressions filled up and edges brought up nearly to their sharpness. In this state the whiting on the molding is from one-sixteenth to one-twelfth of an inch in thickness.

It is now trimmed at the back and edges by cutting off the whiting which has flowed over from the front, which prepares it for the process of smoothing. This is done by means of pieces of pumice and other stones shaped so as to fit the various parts of the molding. A sponge or soft brush is used to wet the molding; and the stone which is to be used, being likewise wetted, is rubbed or worked to and fro along the molding until that part is perfectly smooth. Another stone fitting a different part is then used in the same way, and so on until every part of the length and breadth of the molding has been worked over by the stones. The molding, if the smoothing has been properly performed, now presents a smoothness of surface exceeding and a keenness of edge nearly equaling that which the molding presented when it left the hands of the joiner. But this must be attained without rubbing off too much of the whiting, since the whole beauty of the frame depends mainly on having a sufficient body or foundation of whiting. The brilliant burnishing on frames is in a peculiar degree dependent on the whiting, which is first laid on the wood and which if deficient in quality cannot be adequately replaced by other means. The molding, being thoroughly dried from the effects of the smoothing is rubbed down with glass paper or sandpaper, to take off any little asperities that may remain and to make the whole perfectly smooth. It is now ready for the process of gold sizing. The burnish gold size used in this process is composed of ingredients exceedingly opposite in their nature, such as pipe clay, red chalk, blacklead, suet and bullock's blood. This diversity of ingredients is intended to produce different effects; one substance helps to give a brilliancy to the burnish, another to the mellowness and smoothness, and so on. The form in which the gilder purchases his gold size is that of a solid rather softer than butter. He first takes some very clear size boiled purposely to a smaller degree of strength than the size for thick white, or, if already boiled, weakened by water. This size he usually melts in an earthenware pipkin, although an enameled cauldron furnace heated by gas is a far better proposition. He does not make it very hot, however, but he mixes the gold size with the melted size by means of a clean brush, much in the same manner as a painter mixes his oil paint, the consistency to be about equal to that of cream.

It is a source of some confusion that the same term —burnish gold size—is applied to this creamy liquid as to the thicker substance from which it is prepared; it is necessary to say mixed gold size or unmixed gold size in order to indicate which is meant. This gold size is laid onto the molding either with a very soft hog-hair brush or by a large camel-hair pencil fixed in a goose's quill. The gold size must be barely warm and must be laid on with great care so as to leave it equally thick in every part and obliterate the marks of the brush. Upon the due observance of a medium between hot and cold, strong and weak, and thick and thin in the gold size laid on depends much of the beauty of the molding when gilded. From four to eight coats of this gold size are laid on the molding, each one being perfectly dried before the next is applied. And let it not be forgotten that when much of the work is done there is nothing to beat a gas-heated air heater and blower equipment for the work.

A soft partially worn piece of glass paper is occasionally used to take off any little roughness that may exist. When a sufficient body of gold size is laid on, it is carefully washed with clean water, a soft sponge and a piece of linen rag. This must be done with attention to the soft spots, which are very likely to lose the whole of their gold size if care is not used. The object is to produce a perfectly smooth surface, especially in those parts which are to be matt gold.

The test of good work is to produce the smoothest surface with the least loss of gold size. Where the molding is partially dry from this process, the matt parts are polished with a piece of woolen cloth and the parts to be burnished receive another coating of gold size laid on as smoothly as possible. The piece of molding which is to be gilded is laid along the bench, with one end higher than the other; and as the width of the molding is broken up into several divisions, such as hollows and squares, it would be impossible to make a leaf of gold bend into all the various parts without breaking. The gilder learns by experience how many separate lays, as they are called, of gold will be required to cover the width of the molding without breaking of the gold into irregular figures called spider legs. In general, a deep hollow or a depressed square cannot be gilded at one lay, but must be covered with two strips of gold laid side by side and meeting at the center of the depression. When the gilder has made his decision as to the number of lays that will be required, he selects one lay and proceeds with it through the whole length of the molding before he begins another portion of the width. If the necessary lay be about three-fourths or one-fourth of an inch in width, he cuts the leaf, which is spread out on his cushion, into four strips; if it be about 1 in. in width, he cuts the leaf into three, regulating the division of the leaf of gold according to the width of the lay. It is not often that a larger piece than half a leaf is used at once. The gilder has at hand a pan with clean water and two or three camel-hair pencils of different sizes. With one of these pencils he wets a few inches of that part of the molding which is to form his pivot lay, taking care not to wet much beyond that lay. The water is to be allowed to remain pretty full on the surface after some of it has been imbibed by the gold size. The gilder then takes his tip in his right hand and lays it on the slip of gold that slightly adheres to the hairs; then he places it on the molding, with particular attention to straightness of direction.

It frequently happens that the hairs of the tip will take up the gold; in such case it is usual to rub the hairs between the cheek and the palm of the hand, by which their power of taking up the gold is increased. When the gold is laid on it is blown forcibly to expel as much of the water as possible from beneath it, the dry camel-hair pencil being used to press down any parts which fail to adhere. Another portion is then wetted and another piece laid on, lapping about one-eighth of an inch over the end of the former piece. Then the gilder pro-

ceeds, piece by piece, until the one lay is carried down the whole length of the molding; he then proceeds with another lay joining the former. In doing this he has to observe that the water must be made to flow a little over the edge of the former lay, but not so as to wash it up or break away the edge; the second lay must lap a little over the first, and therefore the water must likewise extend over the first lay. Thus he proceeds with all the lays into which he has found it necessary to divide the width of the molding, every piece lengthwise lapping over the piece previously put on and every lay lapping over the previous lay.

The molding is then set aside to dry and when much of the work is done it is stacked up in a dry room often heated with steam coils. However, although direct gas heat will not be desirable, yet air heated by gas is most satisfactory and is to be recommended. There is a particular state or degree of dryness known only by experience in which the molding is in a fit state for burnishing.

The burnishers used by the gilder are either of flint or agate—generally the former. The steel burnishers used by the jeweler would not do for the gilder. Burnishers of different forms and sizes must be employed, in order to adapt them to the part of the work which is being burnished. They are generally crooked or curved near the end. When the burnishing is done, those parts which have not been burnished are weak sized, that is they are wetted with water in which a very little clear piece of size has been melted; this helps to secure the gold. When dry the gold is wiped carefully with a piece of solft cotton wool to remove rough or ragged edges of gold; and there are now visible a number of little breaks, holes and faulty places in the gilding, arising from the impossibility of laying on the gold quite soundly and perfectly.

These defective parts are repaired by the process of faulting which consists of cutting up a leaf of gold into small pieces and laying them on the faulty places previously wetted with a camel-hair pencil. If the deefctive part is on the brush, it is necessary to be careful not to wet any part but what is to be covered by the gold as it will stain the burnished gold. When the faulting is dry, the gold is again carefully wiped and finally wetted with finishing size. This is clear size of a certain degree of strength, laid on the matt parts with a pencil and completes the process of gilding.

When a glass frame is to be gilded, the joiners work is generally quite completed before the gilder begins and great care is required in whiting such frames to prevent filling up the corners with whiting and giving then a clumsy appearance. For this purpose modeling tools, such as chisels, gouges and crooks are used to clear out the corners from time to time and preserve the original sharpness and clearness of the several parts.

The following is a composition for molding used by gilders and is of interest to gas men in so far as the heating is concerned. They will find that for mixing up such materials a good substantial industrial stove is the best thing to use as it often happens that 3 or 4 or more pots have to be at hand to be heated at once, the size should therefore depend accordingly. The composition, consist of 14 pounds of glue, 7 pounds of resin, ½ pound of pitch, 3½ pints of linseed oil, 5 pints of water more or less according to the quantity required. These are mixed together and the whole boiled together, stirring well till dissolved. They add as much whiting as will render it of a hard consistency. It is then poured into a mold which has been previously oiled with sweet oil. No more should be mixed than can be used before it becomes sensibly hard, so that this is another reason for the industrial stove. In case, however, any is left over it will require steaming before it can be used again.

Another recipe is as follows: They make a very clear glue with 3 parts of Flanders glue and 1 part isinglass, by dissolving the two kinds separately in a relatively large quantity of water; they are then mixed together, after they have been strained through a piece of fine linen to separate the parts which are not able to be dissolved. The quantity of water cannot be fixed, because all kinds of glue are not homogenous, so that some require more than other. The proper strength may be found by allowing the glue to come perfectly cold; it must then barely form a jelly. The glue is to be gently heated (water jacketing is best) then mixed with sawdust sifted through a fine sieve. The molds are then to be oiled with nut oil and the glue pressed into the mold, covered with weighted board and set to dry in a heated dry room. Direct gas heat can be used in this case if necessary, but if a gas aid heater has been installed all the drying can be done with it—and the reader will have noted that there is quite a little in the processes involved which have previously been referred to. When the coating mentioned above is dry it has to be trimmed.

Burnished Gilt Frames—When new burnished gilding requires varnishing, white hard spirit varnish is used or else yellow gold lacquer. Old burnished work must be cleaned with great care. They first remove the dust with a badger-hair brush; afterwards they clean the gilding by passing a clean sponge dipped in alcohol and water, lightly over the surface, wiping off the moisture with a very soft dry sponge or silk handkerchief. They next apply the varnish and finish. Gold frames may be cleaned by simply washing them with a small sponge wet with hot spirits of wine or oil of turpentine, not too wet, but sufficiently so to take off the dirt and fly-marks. They should not be afterward wiped, but left to dry of themselves. In the regilding of frames they take a sponge and some clean water and wash the frame well. It is then allowed to dry. Some water gold size is next procured. They make some thin size from dry hide or parchment (as previously spoken of) and mix enough, warm, with the gold size to enable it to be worked on the frame with a camel-hair brush. It should be given two coats. When dry it is rubbed over with a piece of fine sand paper. It is then ready for gilding. When the frame is covered, it is rested on its edge to drain; when perfectly dry a pencil is dipped into water and the gold wiped over with it; it will take the particles of gold off and make it appear solid. For any parts not covered, bits of leaf are taken with a dry pencil and put on as before; then the whole is given a coat of clear parchment size, the back edges are brushed over with ocher and the frame is then ready.

To gold signs they use both gold and silver leaf. The procedure is of interest to gas men in so much

(*Continued on page 470.*)

How European Gas Companies Are Helping Out in Solution of Economic Problems

Conditions on the Continent Worse than the American Can Realize—In Such a Situation the Public Utilities Stand the Only Centers of Security

By L. W. ALYWN SCHMIDT

There are many who would like to make the gas industry a backseater that has seen its best days and is ready for the scrap heap. For these the gas industry has fulfilled its mission and should now make place to what they call more modern forms of power production. To those, affairs in Europe should be a good lesson. If they will take the trouble and study how the European gas industry has dealt step by step with the many problems caused by the war and the period of reconstruction they will get a good eye-opener. Incidentally they will learn a great deal about, how the gas industry by helping itself helps to solve many of the most pressing problems of modern Europe.

Whole Basis of Life on Continent Destroyed

We in the United States like to look upon Europe just now with a certain condescension. We affect not to understand why Europe cannot find its feet again and we are exceedingly anxious to give advice but do not always desire to give actual help. We judge European conditions from those existing in our own country and we forget entirely, that a judgment passed upon such very unsound evidence cannot be a very correct one.

In truth, conditions are worse in Europe than we can imagine. The whole basis of the life of the continental European countries is destroyed and even England has to struggle hard to keep its head up against very adverse conditions.

"Conditions in Vienna," writes a friend of mine, who is in the position to judge, "are worse than can be imagined. They are so bad that one fails to realize the truth."

"In Germany," another one writes, "the nation has forgotten that it has lost a war. It lives without regard of the future and the past and money is spent recklessly by rich and poor alike. Preventive measures cannot be taken at all, or if taken are coming mostly too late to be of any use."

Letters from England are more hopeful and speak of a slow but sure gain in the direction of the resumption of normal life.

Italy is in the throes of a latent revolution which hides behind the curtain of strike reports while France is afraid to demobilize completely out of fear of losing the control upon the economic machinery of the country.

Public Utilities Only Hope

In such a state of affairs the public utilities are the only centers of security. If the railroads can only be kept running, if the electric power companies will be prevented from breaking down, and if the gas works can go on functioning, not all is yet lost. There may still be worked out a salvation. Let the public utilities fail in their task and ruin is unavoidable.

This fact is fully realized all over Europe and the governments, therefore, are straining every nerve to prevent such a debacle. They are supported in this respect by the public utilities, and the gas industry has taken a leading position in the battle for the continuation of the public service. The severe strain to which the gas companies have been subjected during the last months has tested the mettle of the men in control. It has brought many new men to the foreground and, generally speaking, the works have shown an excellent spirit. But the battle well-nigh might be hopeless, if the gas works were not held by the hope, that their usefulness has really only begun, that the war in fact has provided for the gas works the great opportunity of showing the possibilities of the modern gas industry and has in this way injected a new lease of life into gas making.

There is no doubt that electricity had made a large inroad into the field of the gas enterprises. It had taken away much of the lighting and power business and the enormous energy with which electrical enterprises were pushed by the banks and large capitalists had given them a position of advantage. The war came and suddenly one of the main defects of electrical power generation, as handled in most cases, became fully evident. The electrical industry although offering many advantages in the way of distribution was proven to be a rather wasteful producer of power. This of course applies only to power generation by steam. The coal fired under the boilers of the large generating stations was lost to the nation entirely, and vast quantities of by-products urgently needed for the purposes of the war were squandered in a most irresponsible manner.

Gas Industry Rises To Occasion

Such a wasteful use of national resources might have been passed by as comparatively unimportant in peace times when speed of production and other advantages would counterbalance the excessive and uneconomical use of coal. During the war, however, every ton of coal represented a certain quantity of national effort that could not be well spared. If that effort had to be doubled, because part of the coal was lost in firing the boilers of the electrical works, this meant an actual loss to the nation in men and energy that were wanted for more urgent duties. The European governments, therefore, viewed with grave concern the expansion of the electrical industry during the war and in some cases put an actual stop to it by decreeing a *status quo* which should not be changed. The whole occurrence proved a salutary lesson to statesmen, economists and engineers alike, and this lesson has not been forgotten.

Fortunately the gas industry rose to the occasion and from the needs of the war grew a new policy of gas making and works management that is now slowly beginning to bear fruit. In viewing these new prospects and achievements of the European gas industry, one will do well to forget the differences that have divided Europe during the last five years and rather contemplate the slow growth of unity that is now emerging as the result of the conclusion of the peace treaty and the various conferences that have followed it. England has taken a leading hand in establishing these new conditions and it may be mentioned in passing that the excellent work done in Germany at the present time in rehabilitating the industrial life of the nation is the result of the activities in part at least of an English enterprise that owns many of the best gas works in Germany and other parts of the European continent.

The principal revolutionary work, and that where its labors will prove most useful at the present time, is that of coal conservation in all its aspects. With coal production being at the low level it is just now in Europe the preservation of the small available resources forms one of the most important items of industrial reconstruction. This coal conservation applies into several distinct fields. There is first the problem, how to minimize the consumption of coal as regards bulk. But of just as great importance is the preservation of all those coal contents that are not required for the purposes of making gas.

Imagine to-day the life of a large European city. Thanks to most energetic efforts on the side of the governments, coal is carried to these cities in just sufficient quantities that they can go along at the smallest possible rations. Vienna is nearly entirely without coal and the gas works form the only means for the population to cook food and provide a little comfort during cold days. To get under such circumstances out of coal every cubic inch of gas and to add to the available national energy is a matter of greatest importance. The gas works, in consequence, have made every effort to bring their equipment up to the highest efficiency and while the results are still often disappointing, there is no denying that gas making is carried out to-day more efficiently and with less loss than during any time of the history of the industry.

Old and insufficient equipment has been replaced wherever possible, and repairs have been carried out with the greatest care. The gas industry has been hampered in this respect by two rather inconvenient occurrences, the lack of labor and the lack of important raw materials. Labor has proven to be of inferior quality than that available in prewar times. The work of repairing equipment and handling overstrained equipment requires labor of a special character. The men must be conscientious and must know their job. Such men are still found in England, but on the Continent they are becoming fewer and fewer. The war has undermined the moral of the working class and it refuses to take its share of the general national responsibility. This tendency has been enforced in Germany by the unfortunate political upheaval of a few weeks ago, when the Kapp government tried to stump the government and a national strike was required to break its power. During the strike workers in the gas works were forced by military power to continue operation and the worker has retaliated frequently by the weapon of sabotage. A discontented man can do much to spoil the equipment of a gas plant, and Germany has paid for the political aspirations of its junker class with a mass of gas equipment repairs, that would not have been necessary if Messrs. Kapp and company had left their soldiers where they were instead of forcing them upon an unappreciative German capital.

Outlook Hopeful

But whatever the present trouble of the gas works, the result will be rather beneficial. The enforced period of great economy has taught the industry that savings can be made in many directions, where they had not been attempted before the war, and the lesson, once learned, will be applied in future. One can say to-day with some certainty that the European gas industry will work more efficiently in future, will use less coal and will give better service. The service may not be cheaper than in the past, but it will conform in cost with the general price situation of the country. It will mean in the whole a decided improvement over prewar times.

The effect of such a development upon the application of gas will be very considerable. There is already now noticeable in many regions of Europe an increase in the confidence of the consumer as to the gas supply. During the war many consumers have been added to the existing ones and since the return to peace this tendency has expanded. The difficulty of obtaining coal for industrial purposes has made it advisable for many industrial power consumers to approach the problem, whether it will be possible to use gas instead of coal either for heating the furnaces, or for operating motors. In some instances the electrical industry will be the real beneficiary, but there are a great many cases where the electrical industry cannot serve the purposes for which gas can be applied. Electricity is a good source of power, but its heating qualities are still not sufficiently developed and gas offers a decided advantage. These special fields of industrial employment are now carefully studied by the gas works and it is a very good sign that the studies are not made only from a national aspect but that nearly each gas work is carrying on experiments in its own field of distribution. To introduce gas into the industrial field, requires more than an educational campaign to the consumer, it needs just as much a preliminary course of learning on the side of the gas works. The works, by taking up the problems of their immediate consumers, have a better opportunity of adjusting their supply to the needs of that consumer than can be obtained by a wholesale study of conditions that must necessarily vary in every case In this manner Europe gains at present much experience in the industrial application of gas and a new type of gas engineers grows up rapidly, the duty of which it will be in future to equip factories with gas supply for operation purposes. The results of these studies are not yet available. Every sectional meeting of gas men, be it in England, France or Germany, however, produces evidence of the nearest determination with which the gas industry works on this of its present problems and there is no doubt that the meetings during the next years will give much consideration to the industrial employment of gas. The development will be worth following on this side as we are bound to profit by the European experience.

Gas Industry Becomes Manufacturer

What has been accomplished in this manner in the field of industrial consumption is duplicated now in that of industrial production. The European gas industry has passed during the war the state of indolence by which it regarded itself primarily as a producer and distributor of gas and has taken to manufacturing in a wider sense than was the case before. There is now in Europe a gas industry that manufactures not only gas, but a multitude of other products, closely connected with gas making. This branch of the industry is growing from year to year and promises to be one of the most important developments in the history of gas making. At the present time gas works still confine themselves to make only intermediates and raw materials in the form of by-products. But the increasing splitting-up of the coal product is steadily proceeding. The range of these products is growing until a stage may be reached, where there will be available one product for practically every size of plant. This will mean a more complete use of the coal than ever has been attempted and the possibility of preserving the intermediates for further use opens an entirely new aspect to the gas industry which cannot be fully realized at the present time. One of the principal difficulties in the way of an economical employment of the by-product plant for smaller gas works has been so far the rather high cost of the normal by-product installation and the comparative large quantities of coal that have to be treated, to make the plant competitive. With the increasing splitting-up of the production a solution for this particular obstacle, however, has offered itself that is worth while following up, as it may bring about an entirely new situation. Gas works in Europe are located as a rule in very frequent intervals. There is hardly a city of ten thousand inhabitants that has not a municipal or private gas works, and cities of that size are very frequent. There takes place a very extensive intercourse of opinion amongst these local gas works by way of sectional meetings and their affairs are also often discussed during the meetings of municipal officials. In consequence co-operation between small gas works is a more or less established fact. It has now been suggested to combine these smaller gas works for the purpose of improving their by-product production. Each district has a call for certain by-products, made from coal gas, and it is only a question to find the product and to install the proper plant for manufacturing it. The supply will then be made available to the industry and the whole district benefits. But the small size of the gas plants often prevents making the product. What prevents the gas plants, it is now argued, to have a by-product plant at a certain point which takes charge of the whole by-product work of the districts? Each as far as it can be done economically and the rest would be left to the co-operative plant, that could be attached to the biggest gas plant in the district. The plan is open for many variations. So the different plants might agree to make one product each and might exchange the product and the intermediate as the necessity requires. In this manner the local gas works could make a field of production for themselves entirely independent from the competition of the larger plants, as no big enterprise could aspire successfully to meet the local enterprises in a field of which they have the virtual control. Motor transportation has largely advanced the chances of such a plan and the exchange of intermediates could be carried on at a very low cost to the co-operators.

Cheap by-products is at present one of the principal requirements of the industry of Europe and the gas industry is upon the best road to give them to the European industry at a very low cost. But the employment of all the minor gas plants in the by-product field has an additional advantage that cannot be overlooked. Every gas chemist, who applies himself to by-production work is increasing the potentialities of further discoveries. Where formerly hundreds of chemists were busy to dissect coal, now thousands will be on the job and nobody can say, where all this will lead to. More cause, therefore, to be careful with the raw material that is to bring all these advantages and more necessity for conserving coal. Hence the desire of the gas men that if electricity must be, that it should be generated by way of the gas motor and not by the use of the wasteful boiler production, unless heated by gas.

Sees Price Factor and Increased Water Power Development as Sources of Relief in Petroleum Situation

George Otis Smith Declares It Is High Time to Begin to Weigh the Essential Uses

An estimate of the petroleum resources of the world has just been published by the Chief Geologist of the U. S. Geological Survey, David White, and his figure of 60,000,000,000 barrels for the whole world is doubtless exact enough to enable us to see the oil situation of the United States in fairly true perspective, declared George Otis Smith, Director of the U. S. Geological Survey, in a paper before the American Iron and Steel Institute in its recent meeting in New York City. Using within our own borders fully half of the world's annual production of petroleum, we seem to possess only about one-seventh of what remains. This lack of national self-sufficiency in oil reserves may be expressed in another way; contrast the international position of the United States in respect to oil with its position in respect to coal. In the past ten years our 6,000 to 7,000 coal mines have contributed 41 per cent of the world's output of coal. Our present estimates credit the United States with more than half of the world's coal reserves, so that if we are to think in world terms the great tonnage of coal produced by this country each year represents less than our national share. But now consider the petroleum situation: in these same ten years our 140,000 to 200,000 oil wells have poured forth more than 61 per cent of the world's output, although we now believe that the United States possesses only about 12 per cent of the oil left to the world for its future use, so that in oil our nation is doing far more than its share.

Coke By-Products Limited

When we come to consider substitutes for petroleum products, the capacity of your own steel indus-

try for furnishing benzol and alcohol as by-products deserves first mention. I am informed by Mr. Walker of the United States Steel Corporation that plants now in operation and under construction have a capacity of 95,000,000 gallons a year—that is, if the output of light oils is converted into motor benzol. Such an annual contribution of less than 2,000,000 barrels, however, is equivalent to not much more than a week's output of gasoline as the refineries of the United States are now running. The recovery of alcohol from your coke ovens has not yet begun, but British experience seems to show that the maximum alcohol capacity of the coke ovens of the United States might be less than their benzol capacity. Apparently, then, the benzol and alcohol possibilities of the steel industry cannot be regarded as promising enough motor fuel even to meet the present increase in demand. It must be recognized, however, that this country, as the world's greatest consumer of coal, has not fairly begun by-product recovery. With the higher cost of coal and this increased demand for by-products more efficient practice must result in the natural course of economic events.

The oil-shale resources of our country must not be overlooked nor their national value underestimated as a rear line of economic defense. As their oil content is fairly comparable with the petroleum reserves of the world, these shales furnish an effective guaranty against the United States going bone-dry as to oil, but the oil won from oil shales will not be labor-cheap like the petroleum now flowing from our wells. As long as industry is shorthanded it cannot look for relief from oil shale nor can it expect any return to low prices by utilizing this resource, however vast its extent; yet these Western mountains of oil-shale stand as a visible promise that even when our underground reservoirs of petroleum are drained the United States will not be at the commercial mercy of any foreign power—not even if that power has been prompt to take advantage of the present opportunity to acquire a majority share in the world's oil resources. Still, even with the largest measure of optimism, backed up with our oil shales, we must face the contingency that the next generation of American business men may see their trade rivals across the Atlantic turning the wheels of industry and commerce with cheaper oil than is available in the American markets. Regard for the future, then, forces us to plan how to use less oil at home and how to acquire our share of the foreign supply.

Essential Uses of Petroleum

It is high time for us to begin to weigh the essential uses of petroleum. Oil was first used as an illuminant, but to-day, whether in the kerosene lamp on the modern frontier or as gas-oil to enrich the gas of the city, this use of a petroleum product is not increasing on the same scale as the industrial uses. In power generation oil takes on much larger economic values, whether as gasoline or as fuel oil. The demand for gasoline seems to obey no law of normal increase, and the higher cost of coal in recent years has greatly stimulated the use of fuel oil under steam boilers. Fortunately the rapid increase in the consumption of fuel oil by locomotives seems to have been checked at about the same time that it has found a wider use in stationary steam plants. Last year the public utility power plants of the United States consumed 11,000,000 barrels of fuel oil in generating electricity, nearly half of it in coalless California. In the East the present oil shortage has doubtless started a reaction in the popularity of fuel oil caused by the coal shortage in the war years. The more adequate and reliable supply of coal must in the long run give coal the advantage for use under stationary boilers; for despite the labor economy attained through oil, the assurance of an unfailing supply of fuel is of first importance in industry.

Prices also will eventually exert an automatic control on the use of oil products. Not only is the inadequate supply stimulating high-cost production as well as rewarding low-cost operation with unusual profits, but however much we may desire low-priced gasoline we cannot wave aside the economic facts of supply and demand. High prices are here for crude oil and for every one of its products, and high prices will help to bring about a kind of economic survival. The more essential use of oil—that is, the use of oil where it serves the greatest end—will survive, and business practice, public opinion, and even, if needed, Governmental regulation, should work together to enforce obedience to this democratic rule of the greatest good to the greatest number. Plenty and cheapness have led to waste; scarcity and dearness ought to promote thrift. It is a problem for the nation as well as for your individual plant to get larger values out of the high-cost coal and oil.

Electricity as a Substitute for Oil Fuel

In any weighing of the uses of petroleum, certain changes in practice appear inevitable. The use of gasoline to serve our pleasure cannot go on unchecked—the joy ride is not the kind of "pursuit of happiness" regarded as an "unalienable right" by our revolutionary fathers. The use of fuel oil as a substitute for coal must be discouraged, for our navy and our merchant marine need the fluid fuel for reasons that do not apply to stationary boilers or even steam locomotives. On terra firma a power program can be worked out that will hitch up coal mine and waterfall efficiently, and both industry and transportation can be fully electrified to the end that, except perhaps on the Pacific Coast, not a barrel of oil should be used under boilers. The necessity of caution in enlarging the field of fuel oil is the more apparent when we realize that, as suggested by the Bureau of Mines, every increase in demand for other petroleum products for a higher use entails a loss in the percentage of fuel oil produced.

The requirements of the American Navy and the new merchant marine present a priority demand of the first order. Admiral Griffin, the Chief of the Bureau of Steam Engineering of the United States Navy, informs me that the oil-burning vessels ready for service aggregate more than 6,000,000 horsepower and that other vessels under construction will bring this total up to nearly 9,000,000 horsepower. The navy now needs 8,000,000 barrels of fuel oil a year, yet this figure is small compared with the requirements of the Shipping Board, which are stated by Paul Foley, its director of operations, as 40,000,000 barrels for 1920 and 60,000,000 for 1921. If the American flag is to fly on the seven seas the motive power to carry it must be assured, and here is one

(*Continued on page* 473.)

American Gas Engineering Journal

SIXTY-FIRST YEAR

Published Weekly by AMERICAN GAS LIGHT JOURNAL, INC., 150 Nassau Street, New York, N. Y.

ELBERT P. CALLENDER, Pres. S. G. KRAKE, Vice-Pres. FREDERICK A. SOUTHWORTH, Sec'y-Treas.

EUGENE C. MILES, Editor

Subscription $3.00 per year, including postage in the United States, Mexico, Cuba, Porto Rico, Hawaii or the Philippines; in Canada, $4.00; foreign, $5.00—Single Copies, 10 cents

Contents of This Issue

GAS AS USED IN FEATHER GILDING, SILVERING AND KINDRED PROCESSES—BY GILBERT C. SHADWELL 461

HOW EUROPEAN GAS COMPANIES ARE HELPING OUT IN SOLUTION OF ECONOMIC PROBLEMS—BY L. W. ALWYN SCHMIDT 465

SEES PRICE FACTOR AND INCREASED WATER POWER DEVELOPMENT AS SOURCES OF RELIEF IN PETROLEUM SITUATION 467

EDITORIALS 469

MERCHANDISING 475

NEWS OF THE GAS INDUSTRY 476

PERSONAL NOTES 479

As the Journal Views It

New Blood in the Industry

The gas industry apparently is taking definite action toward seeking to attract a very desirable type of young man to its ranks. But to succeed it must sell the young man with the idea: Compensation to be had is equitably proportional to the talent and energy required for the task; the opportunity to forge ahead is limited only by the young man's ambition and ability. We greatly fear, in the present situation, the results of the gas industry's selling effort will be practically nil.

The young college man is under no compulsion other than his own will to come to the gas industry. He has to attract him, if an engineer, rather unattractive surroundings in usually an undesirable part of the city, long hours and meager pay, a tendency in too many cases to stifle individualism and a jealousy, on the part of some higher up on the ladder than he, of any opportunity he may find to reveal broadly any unusual merit, an industry that financially is manifestly down in the mouth, and an audience that is not only indifferent but actually hostile and distrustful.

As against this he might select to enter the selling end of the automobile industry, enjoy short hours and big commissions, be all dressed up himself, and meet and mingle with nice people of a similar sort.

Or he might select the foreign field following his own profession. There is fine pay, variety in surroundings, travel, extravagant appreciation of merit, and so on.

Or he might enter politics and, if sufficiently uneducated in the broad sense, with easy conscience

hound to the brink of ruin street railway companies, gas companies, etc., become the mayor of a great city or possibly a public service commissioner.

There is need for the gas industry to attract to its ranks young men of unlimited potentialities. But to accomplish it there is much to be done by ourselves and by regulatory commissions to make it an industry worth coming into.

Leaning Toward the Bungalow Type in Colder Sections

The bungalow up to a very few years ago as an all-year residence was almost exclusively a feature of the milder climates.

The need of getting some kind of a roof over one's head is bringing it much to the fore in the colder parts.

Builders of portable homes of this type are doing a rush business. Even the possession of the necessary funds apparently is not enough to get assurance of a home of the permanent type being erected, and the portable building people are taking good advantage of their opportunity.

A single-floor dwelling place affords an ideal situation for gas heating. As it is usually comparatively small and scientifically compact, the cost-of-fuel element enters to but a minor degree.

If the gas companies desire it we should see the foundations laid down for a considerable house-heating business before the cool and cold days again come upon us.

Not Enough Changing About in Gas Company Organization

It sounds like a challenge, the above caption, and an obvious misstatement of fact. But it doesn't refer to the labor ranks, the only truly prosperous ranks in the gas industry, but rather to those who work with their heads rather than their hands.

For the good of the industry and for the good of the individual there is too much of this settling down for life with particular companies in the gas field.

The basic processes of gas manufacture, distribution and sale are quite general with all companies. But mental workers are not machines. Superintendents doubtless start off with a new installation following manufacturers' directions almost explicitly.

Assuming three plants starting off with similar equipment at the same time, they are all alike at this period.

But as the months roll by the man at No. 1 introduces short cuts here and there that he discovers and tries out from day to day—refinements and improvements on the cut-and-dried and routine. No. 2 does likewise but in different ways perhaps. And so with No. 3.

So in time, though essentially the same, operating practice in the three plants becomes quite different.

The service supplied by gas journals, papers at association conventions, etc., all tend to harmonize practice between plants and keep those at X informed as to changes and improvements at Y. But they do not succeed 100 per cent. Perhaps they do not succeed 50 per cent. There is a great deal learned by the direct contact plan in the gas industry even to-day.

An assistant at No. 1 plant going as assistant to No. 2 plant would be benefited by the experience even if the methods of No. 2 plant were inferior. His mind would be freshened up and set to reasoning out underlying causes.

The same old methods, same old surroundings grow monotonous and tend to warp up the mind. It is easy to get in a rut. One's plannings should be directed toward keeping out of grooves.

With one company one can in time more or less get a line on the character of those above, ascertain their vulnerable spots and in time rise through wiles and diplomacy, even though real working ability be lacking.

But the technical worker, the commercial man, the subordinate executive in the gas field should endeavor to make his merit so broadly known that his possibilities are not bounded by the limited opportunities one company affords but rather by the opportunities of the whole gas field.

Gas company heads should encourage this attitude on the part of their employees.

Once sold on it completely the employee's ambitions and methods will be directed along proper lines.

When the salesman at X, for instance, comes to look upon the gas industry and not the gas company as the field of his opportunity, he will not lay much stress on his ingratiating manner but a great deal on his ability to produce results. He might manage, by dint of flattery perhaps, to make the manager at X impressed with the idea he ought to have more money, but his facility along these lines will not go far with the manager at Y, a thousand miles distant. But a startling percentage of sales will make Y's manager immediately take note. And it takes real work and ability to produce such results.

Gas Used in Feather Gilding—Silvering and Kindred Processes

(*Continued from page* 464.)

that heat is used in certain parts of the process as will be seen. A little piece of isinglass is taken to the extent of about as much as will be on a five-cent piece. This is put in a pot, set on an individual stove and boiled in water. Then as much alcohol is added as there is water and it is strained through silk. The letters are then painted on a sheet of paper with Brunswick black. The paper is fixed with the writing reversed on the glass. The isinglass solution is used as a mordant, laying it on with a camel's-hair pencil and the gold leaf is then applied.

The glass is placed in a warm room and when the gilding is dry it is rubbed over with a piece of cotton wool. A flat camel's hair brush, moistened with the isinglass solution is then passed lightly over the gold letters. The solution must be hot for this operation. A second coating of gold leaf improves the work. The outline is then marked in on the back with soap and a size used composed of gum tragacanth in water, having the size as thin as possible. There is a solution for gilding silver which may be referred to which is made as follows: Dissolve equal parts, by weight, of bichloride of mercury (corrosive sublimate) and chloride of ammonium (sal ammoniac) in nitric acid; now there is added some grain gold to the mixture and the liquid is evaporated to half its bulk. It is then applied while hot to the surface of the silver article. An oil size for gilding is another composition needing heat for its use, etc., and will be likewise given. The making of it is as follows: Grind calcined red ocher with the best and oldest drying oil and mix with it a little oil of turpentine when used. When the work is to be gilded a little parchment size is made as before and heated up; then the above size is applied, where requisite, either in patterns or letters and it is allowed to remain till, but touching it with the finger, it feels just sticky; then apply the gold leaf and dab it on with a little piece of cotton; in about an hour wash off the superfluous gold with a sponge and water, and when dry varnish with copal varnish.

A size for bronzing and gilding may here be briefly spoken of. It consists of a combination of asphaltum, drying oil and spirits of turpentine. It is a useful size for both bronzing and pale gilding. A size for cloth, silk, etc., is made by taking a little honey and mixing it with thick glue by a water-jacketed glue heater or ordinary gas heater water bath. It has, of course, to be reduced to the proper consistency and it then has the effect of giving a fine bright luster.

So far as the preserving of gilding is concerned (such as the gilding on frames, etc.), this can be rendered much more durable without interfering with its luster by giving it a coat with a warm mixture of 1 part of linseed oil and 2 of turpentine. To clean the gilding of fly specks, a mixture of 1 part of ammonia to 3 or 4 parts of water is recommended.

To repair luster gilding, which has already been spoken of, they usually make a compound by melting Venetian turpentine, white wax and a little soap. This is done over a gas burner and the same industrial stove will be found very useful for the purpose. It is applied to the injured places with a brush and is allowed to remain for an hour, after which the gilding is laid on.

The reader will run across numerous places where work of different kinds, along the lines mentioned, is done, and the chief reason for mentioning matters of this character is to familiarize him with such points in order that he may both gain business and save time in making inquiry when such protests are "run up against."

Another use for gas is in water gilding upon silver. In this case they pour vinegar (strong) on copper flakes; they then add alum and salt in equal quantities. After this it is put in a container of a suitable kind and set over a burner (there the industrial stove again comes into play). When the vinegar has boiled until it becomes one-fourth part its original quantity, they throw into it the metal it is desired to gild and it will assume a copper color. If it is continued boiling it will change into a fine gold color. Polished steel may also be beautifully gilded by means of the ethereal solution of gold. This is done as follows: Dissolve pure gold in aqua-regia, evaporate gently to dryness so as to drive off the superfluous acid, redissolve in water, and add three times its bulk of sulphuric ether. Allow to stand for six hours in a stoppered bottle and the ethereal solution of gold will float to the top. Polished steel dipped in this is at once beautifully gilded and by tracing patterns on the surface of the metal with any kind of varnish beautiful designs and devices in plain metal and gilt are produced. For other metals the electro process is the best, but gas men will find certain buckle and steel button, etc., manufacturers carrying out such processes and should get their business.

A gilding varnish sometimes used is beeswax, 4 ounces, and verdigris and sulphate of copper, each 1 ounce. This is heated and mixed together. Another form of the same is made of beeswax, 4 ounces, and verdigris, red ocher and alum, each 1 ounce. This is heated and mixed together in just the same way. It is used to give a red-gold color to water gilding.

Returning to the matter of gilding metal surfaces, there is much to be said of interest to readers in view of the fact that such work has recently increased considerably in this country, whereas it was almost entirely carried out in Europe until recently. A French method of gilding in the form of brilliant as well as dull or matt on wrought or cast iron, as well as on other metal surfaces, by means of sulphide of gold is of particular interest. It is carried out both by means of the brush and the bath. This process consists in covering the metal under treatment with a thin yet solid coating of gold, presenting a very rich metallic appearance, produced without having recourse to burnishing or polishing. The first operation gives what we will call product No. 1, and is as follows: They dissolve a kilogram of pure alum in a sufficient quantity (but smallest amount necessary) of water; when it is completely dissolved they pour on to it a liter of ammonia (alkali). The alum precipitates itself into the form of a very thick jelly, and they pour this precipitate onto a filter in order to draw off as much liquid as possible. The alum is next put into a porcelain capsule and they add 500 grams of nitric acid, which has the property of redissolving the alum.

After this they put, for dissolving, in another container 150 grams of carbonate of cobalt with 200 grams of nitric acid, and the solution is helped by the moderate heat of a sand bath over a bunsen burner. The solution being effected, there is poured on it the dissolved alum and both are well mixed together. The complete evaporation of the acids is assisted by placing the container upon a strongly heated sand bath. The product is collected and pounded, whereupon it is calcined in a crucible by a strong heat in a muffle furnace before using it in the following composition, which we will call—

Product No. 2—There is melted in a crucible placed in a muffle furnace the subjoined composition, which must be thoroughly mixed:

	Kilos	Grams
Product No. 1		600
Orange oxide of lead	3	200
Boric acid		800
Finely powdered white glass		200
Total	4	800

The melting being effected, it is poured into cold water and afterwards dried and ground by means similar to those employed for grinding enamels. Spirits of turpentine are used in the operations of grinding, which must be continued until a considerable degree of fineness is obtained in order to facilitate the working.

If the product be too thick, the quantity of turpentine necessary to reduce it may be added. We now come to—

Product No. 3—There is dissolved in a porcelain vessel the following: Pure gold, 100 grams; aqua-regia (muriatic acid, 200 grams; nitric acid, 100 grams).

The dissolving of this is effected by a sand bath moderately heated by a gas burner. They then add 2 grams of pure tin and 2 grams of arsenious acid. They evaporate about one-half of the acids, leave the mixture to cool, and then add 150 grams of distilled water. This solution is placed aside and then the following operation is proceeded with, which is spoken of as—

Product No. 4—They put into a glass retort 150 grams of turpentined balsam of sulphur containing 20 per cent of sulphur (as it is usually prepared by pharmaceutical chemists), 40 grams of Venice turpentine and 200 grams of essential oil of lavender. This mixture is heated in a sand bath until the liquid attains a deep red color, at which point they remove it and allow it to cool.

When cooled they pour the mixture into a porcelain container and then slowly pour the product No. 3, taking care to stir thoroughly and constantly product No. 4 with a glass spatula. This can be done mechanically if desired owing to the difficulty of slowly pouring with one hand and stirring with the other. When product No. 3 is poured out there becomes formed in the No. 4 container a very stiff substance of a rich bright-brown color. If the desired color be not at once obtained, it is usual to slowly warm the mixture, stirring it all the while. If it is removed from the bath directly it is observed that the desired change is effected. When the above indicated condition is reached the product is allowed to cool, as the gold has then separated from the acids. After becoming cool they extract, as far as possible, the acids and place the mixture aside until the next day. They again extract what little acid may have become separated, and then they pour upon it, drop by drop, 50 grams of ammonia, or sufficient to cause a reaction. Sometimes as much as this quantity is not requisite.

The mixture is effected very easily. They allow it to remain for about two hours and they then pour upon this product 300 grams of essential oil of lavender. They then heat slightly for the purpose of mixing thoroughly and leave it to cool. The product is then filtered by means of a paper filter which is steeped in oil of lavender in order to render it impermeable to water.

The golden liquid passes through which the ammoniacal water remains on the filter and the product thus obtained is ready for use on leaving the filter.

Many other methods for obtaining gold in this state are to be found described and applied to porcelain, pottery and glass, but are imperfect for application to metals.

To obtain brilliant gilding upon wrought or cast iron, copper or other metals it is necessary to proceed as follows: The objects to be operated upon have to be very clean, free from oxidation or any foreign substances; the objects being in such condition are slightly warmed in a warming oven to remove all humidity; then a brush is dipped into Product No. 2 and the objects are coated, care being taken to cover the same thoroughly of an even thickness, that is to say, the thickness generally known technically in oil painting as a round coating of color. The objects thus covered are next placed in a closet to preserve them from dust and there left to dry. The closet may be supplied with heat from an air heater or radiator, if desired. Afterwards they are placed for heating in an oven similar to the enameling type, and of an appropriate size.

On their withdrawal from the oven the objects will have assumed a very brilliant blue-black aspect. After cooling, they are ready for receiving the gilding, which is obtained by dipping a brush into the golden liquid, i. e., Product No. 4, and evenly coating the objects with a very thin coating. They are then allowed to dry for some hours, protected from the dust and then they are again heated in the oven as previously described, care being taken to heat them gradually in order to prevent the blistering of the gold. The transformation is seen to take place by the objects changing their blue-black tint and becoming yellow and brilliant. It is at this point they should be drawn from the oven, when will become apparent the beauty and solidity of the gilding which is more solid and more brilliant than any other.

In order to obtain a flat or dull (matt) gilt it is necessary to put on a very thin coating of Product No. 2 so that it may remain dull, because the brilliancy is solely due to the thickness of this coating. The objects being dull the gilding will be dull.

Should it be desired to avoid the use of Product No. 2, and nevertheless obtain a brilliant gilding, this may be accomplished by first polishing the objects by the ordinary means of tool, lathe or polish. The coating of gold when applied to polished metals becomes brilliant, but it is necessary to apply a thicker coating upon cast iron, which is more porous and dull, gilding is in like manner obtained upon rough metal; still it is always advantageous to make use of Product No. 2 because it will economize ¾ of the gold used upon plain metal. As must be observed, this application is one of facility and simplicity; it is not costly and above it all it provides quite some equipment, relatively, for the gas man to supply.

In conclusion, the writer somewhat regrets that it became necessary to go to so great a length in treating on this subject, but it has been felt that it was too important to curtail as it is probably the first story of its kind ever presented to the gas man. The writer hopes that it may open up quite a new field to many.

Demand for a Small Tank Water Heater

There has been during the Spring a great demand for small tank water heaters, especially one particular moderate priced type. The sales of it were probably largest in territories supplied with gas where in hundreds of homes means of heating water are not dependent on the superior convenience of gas.

The backward season made a late demand for space heaters run by gas.

Sees Price Factor and Increased Water Power Development as Sources of Relief in Petroleum Situation

(*Continued from page* 468.)

demand for fuel oil which alone equals the present output of our refineries for about four months. Surely no American with vision wishes to contemplate even the possibility of a shortage of fuel oil that would endanger the immediate availability of these battleships, cruisers and destroyers or interfere with the successful operation of the steamers in the construction of which our nation has invested so many millions.

Use of Power and Machinery Increasing

In our attention to the generation of power to meet the needs of industry and transportation we give too little thought to one unique function of oil—that of saving power. Machinery without lubrication is unthinkable; adequate lubrication saves energy and makes it available for use as well as adds to the life of the machine. There is little danger of shortage in lubricating oil for our navy, for the daily refinery output, as reported by the Bureau of Mines, is almost sufficient to supply the navy for a year with lubricating oil, whereas about three weeks' run would be necessary to meet the navy's annual needs in fuel oil. Yet, on second thought, we realize how universal is the use of lubricating oil, in the home as well as in the largest steel plant, in the motorcycle and locomotive, in the electric fan and the power station —everywhere oil is needed in the bearings, a single drop or many gallons. And in looking to industry's future needs of this petroleum product large plans should be made, for our use of power and machinery is increasing faster than is generally appreciated. The statistics of electric power generation collected monthly by the Geological Survey show that the war-peak was exceeded last year, and already the opening months of 1920 are ahead of the corresponding months of 1919 by 14 per cent.

This need for oil to insure our industrial life inspires the call for pioneering on other continents by American oil companies. In the world estimates we credit South America with a third more oil reserves than the United States, so that one guidepost for the explorer and developer plainly points to the south. To the steel industry, this American hunt for oil, not only in the Western Hemisphere but in the Far East, has special significance. Wherever an oil field is developed by American capital not only will its product be available either for our home refineries or for the more distant American bunker stations at the world's crossroads, but all the supplies needed to develop and operate this foreign oil field will come from the United States. An "International Oil" operating in South America means another market for the product of a "National Tube" operating in Pennsylvania.

Benzol Recovery Reacts in Increased Corrosion of Mains

In Vienna last year numerous stoppages in mains and services occurred, which at first were attributed to an increased sulphuretted hydrogen content of the gas. The latter was due to labor shortage and the consequent impossibility of changing the purifying material as often as formerly. Analyses of the solid matter which caused the stoppages showed a sulphur content up to 2.5 per cent; but the matter was found to contain chiefly rust and prussian blue. The formation of the stoppages was, therefore, doubtless due in part to the cyanogen and the water vapor contained in the gas, as was confirmed by laboratory experiments. The water vapor in the gas causes rust in the pipes; and the iron hydroxide thus formed takes the cyanogen out of the gas, while the sulphuretted hydrogen has no effect.

The process can, therefore, really be attributed to the extraction of benzol from the gas, which was compulsory in Austria during the war. The gas, deprived of benzol at the works, takes up the fatty material deposited previously within the interior of the pipes, and so exposes them to the action of rust. In cases where benzol has still to be removed from the gas supplied, means must be found, says the author, to obviate this rusting.

Experiments with this end in view were made in Vienna; and it was resolved to find the relation existing between the benzol contained in coal gas and the fatty deposits in gas mains. A mixture of equal parts of benzol-free gas and gas containing benzol was found to cause a considerable deposit of oily matter; but when the benzol-free gas was in the proportion of two to one, the deposit was very slight and scarcely noticeable. An experiment was made by saturating benzol-free gas with solvent naphtha before passing it into the mains. But quite apart from the high cost of such a process, it was found that no protective deposit was formed in the mains.

Natural Gas Survey

The city of Cleveland, Ohio, which receives its gas supply from the natural gas fields of West Virginia, is to have a survey of the situation in this State made by an "expert," according to the following despatch from Cleveland:

A survey of the West Virginia fields to determine the available gas supply is to be started shortly.

Franchise Commissioner Marshall said that information promised by West Virginia producing companies on the amount of gasoline extracted from natural gas delivered to Cleveland had not been received. This phase of the question is to be investigated.

Gas men of West Virginia are wondering just what the Cleveland City Council hopes to gain by this move. It is pointed out that unless the Supreme Court of the United States intervenes and declares the Steptoe law, a measure recently written into the statute books of the State aimed to conserve natural gas and devote it entirely to the interests of West Virginia citizens and industries, Cleveland will probably have its supply of natural gas cut off entirely.

Gas men as a whole make light of the action of the Cleveland Council and refuse to be alarmed over the proposed investigation. As one stated, "An ordinary West Virginia schoolboy could tell the Cleveland City Council that extraction of gasoline from gas makes virtually no difference in the heating qualities of gas."

The Personal Element in Advertising

The Portland, Ore., Gas & Coke Company Runs New Series of Advertisements Taken from Life

By S. G. ADDISON

The Portland Gas & Coke Company, of Portland, Ore., has published in the recent issues of the Portland daily papers a new series of pictures taken from life to advertise its appliances. This makes the fourth series.

The company noticed considerable inquiry for false fireplaces to use with the Humphrey Radiantfire. In some cases these were made out of wood, set in perhaps with tile, and in other cases out of brick, but some ingenious Westerner invented a composition consisting as we understand, principally out of cement and sawdust, and has gone into the business of making false fireplaces exclusively for the gas company to sell with Radiantfires.

The gas company arranged a special parlor to display the mantels, as shown in the illustration. This view showing the five mantels was the first picture published in the newspapers as the usual teaser, just like real estate men, when they want to induce people to locate in their tract, build what is known as a Come-on House.

The readers of the paper, seeing the good-looking salesman waiting on four charming young ladies all at one time, explaining the merits of the Radiantfire and pointing at mantel No. 2 as his particular choice, were naturally interested in seeing the succeeding pictures which were very much more striking, inasmuch as they could show more detail. There was the "Reverie" picture, Mantel No. 1, with the young lady watching the beautiful opal light glowing in the radiants; the "Two Friends" getting warmed up in front of Mantel No. 4; the lady in front of Mantel No. 5 warming her hands and smiling at the little child (which mantel finished in brown is particularly adapted to a Western bungalow.) Then there was the very attractive picture of Mantel No. 3 called "Toasting Her Toes"; and last, but not least by any means, Mantel No. 2 with the "Three Graces" in statuette, and three young ladies gracing the picture.

It is said that Portland is the largest customer for Radiantfires of any place in the far West after Los Angeles. Also that out there in the Rose City on the Willamette River they order them by the thousand at a clip. The original and persistent advertising which has been indulged in by the Portland Gas & Coke Company to acquaint the public with the merits of this appliance has borne fruit commensurate with the effort and energy put into the publicity stunts.

They are finished in various shades to suit the individual taste. A mantel somewhat like the No. 1 style, only still smaller, has been standing in the entrance of the company's salesrooms all winter, but with the advent of spring has been removed for the time being, while immediately adjoining the place where people pay their gas bills and order briquets, is a false fireplace built out of locally made brick, in which a No. 102 Radiantfire is kept going almost the entire year, which the cool summers of this Pacific Coast city make possible.

It has been found that the Radiantfire helps nicely towards filling up the valleys in the gas business, as they are especially used at the very time when weather conditions induce people to shut off the furnace in the spring, or in the fall before the furnace has been started again, and there is hardly a month during the Portland summers that a Radiantfire doesn't come in handy more than one morning or evening.

SPECIAL PARLOR ARRANGED TO DISPLAY THE DIFFERENT TYPES OF MANTELS

No. 1 No. 2 No. 3

Gas Co. Reiterates Its Policy Toward Public in Same Advertisement Month After Month

By Frank H. Williams

For the purpose of acquainting the public fully with the company's attitude toward the public the Northern Indiana Gas & Electric Company, of Fort Wayne, Ind., is publishing the same advertisement month after month in which these things are presented.

The advertisement makes this statement regarding the constant repetition of the advertisement: "The company's policy as outlined above will be brought to the notice of the public monthly by publication in this space. S. E. Mulholland, vice-president."

The advertisement is headed: "The Public Is Entitled to Courteous Treatment and the Best Possible Service at All Times."

Under this heading the advertisement is in two sections, one section addressed "To the Public" and the other addressed "To Our Employees." Under the section addressed to the public appears the following:

"You are entitled to good service and we want you to have it.

"Please do us the favor of selecting our office as the proper place to register complaints.

"We are always ready and anxious to investigate any and all complaints and to rectify errors.

"No individual or company can always be perfect. We invite your help and ask your co-operation in bettering our service.

"It is our hope and desire that our relations may be uniformly cordial and pleasant. Please tell us your troubles and we will gladly do our part toward remedying any difficulty. Your criticism and complaints are invited at all times and any employee in any department who fails to welcome same and do his utmost to furnish you good service and rectify errors, is not rightly represetning this company and its policy towards the public."

In the section addressed to the employees appears the following statement:

"The company's reputation is in your hands.

"Never attempt to take advantage of a patron.

"The company wants no revenue it does not earn.

"Remember that you are in the service of the public as well as the company.

"The company recognizes its obligation to the public and the conduct of each individual employee should so demonstrate.

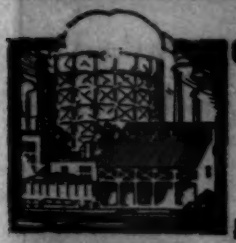
"Courtesy is the most valuable asset that an employee of the company can possess. The best efforts of the company to please its patrons are sometimes offset by the thoughtlessness of an employee who may fail to remember that any act of his which develops ill-feeling reacts upon the company and upon his fellow employees."

So that the advertisement cannot be overlooked by the readers of the newspapers through any overcrowding by big space advertisements, the gas company has used sufficient space each time the advertisement is printed to make it stand out and get read. This space is five columns wide by fifteen inches deep.

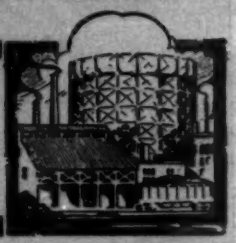
Isn't there a hint in this for the executives of other gas companies? Isn't one of the most effective ways of convincing the public of the company's desire to serve the public right, to advertise this desire and to keep on advertising it until by the very dint of repetition the public comes to believe that the advertisements mean just what they say?

At any rate this is an interesting example of one way in which advertising can be effectively used by a gas company.

No. 4 No. 5



NEWS OF THE GAS INDUSTRY



How N. Y. Company Helps Consumers to Visualize What Is Behind Gas

When you speak of the gas supply in Manhattan and the Bronx you are unconsciously speaking of one million tons of coal, one hundred and thirty-four millions of gallons of oil, millions of dollars represented by real estate used in gas business and many more millions of dollars invested in plants, gas mains and all that constitutes or comprises the largest and most modern gas manufacturing undertaking in the world. The Consolidated Gas Company of New York and its affiliated gas companies—the New Amsterdam Gas Company, the Standard Gas Light Company, the New York Mutual Gas Light Company, the Central Union Gas Company and the Northern Union Gas Company—represent a financial investment of many millions of dollars. A further interpretation of the words "gas supply" includes labor, another very important element. In the home the words means comfort and absolute necessity and the same is true in the industrial field.

All of the above-mentioned factors may be visualized hereafter when you see in the distance a gas-holder that stands down by the water side. You will realize how essential that holder is in assuring you even your small supply of gas for your cooking, lighting, heating and water heating. It is a part of the all-day-and-all-night, year-in-and-year-out service that you are familiar with through daily usage. There are thousands of "customers" who appear not to be daily users of the gas of the Consolidated Gas Company, as shown by the records of the company last April, when 16,700 did not use any gas, and 19,700 used from 100 to 400 cu. ft. The affiliated companies also show large figures among those two classes. All the companies combined must be ready to supply thirty-four billion cubic feet of gas a year. The phenomenal amount of 166,000,000 and more cubic feet of gas was supplied on one day last winter.

It was for the purpose of providing not only for the present and the immediate future, but for many years to come that the purchase was made of 377 acres of land, with an extensive water frontage at Astoria, L. I., where the Astoria Light, Heat & Power Company, a subsidiary of the Consolidated Gas Company, now has the largest gas manufacturing plant in the world. Two of the buildings, or units, at Astoria are devoted to the manufacture of coal-gas. A third unit is a water-gas plant.

Another water-gas unit is being built, the second of its kind at Astoria, and will be ready for operation next winter. This new unit will produce 30,000,000 cu. ft. of gas daily, so that the total daily capacity of the Astoria plant will be 80,000,000 cu. ft. One of the Astoria retort houses is 542 ft. long, 125 ft. wide and 43 ft. in height. Another is 489 ft. long, 141 ft. wide and 42 ft. high. These dimensions are given to show you the magnitude of the undertaking. Everything else is in like proportion. For instance, the gas-holder which is 260 ft. in height and 300 ft. in diameter, is the largest in the world, having a capacity of 15,000,000 cu. ft. of gas. The tank for another gas-holder of the same size has just been constructed.

Much has been said and written about the present coal situation and there has been a great deal of conjecture or speculation as to the supply of oil. The price of coal has been soaring and the same is true of gas oil, with the fear that sufficient quantities of the latter will be unobtainable. At 16 cents a gallon, it would cost—for the oil alone—a fraction more than 64 cents to manufacture 1,000 cu. ft. of water-gas. Seventy-eight per cent of the gas used in this city is water-gas. A faint idea only of the process of coal-gas making can be given here. When a boat-load of coal has arrived at the Astoria bulkhead the barge is emptied, two tons at a time, by a huge bucket. A bucket holding seven tons picks up the coal and, traveling along a bridge 600 ft. in length, distributes the coal where it can readily be transferred to cars on a railroad that runs only on the company's property or be sent through an underground tunnel into the retort houses, where the coal is crushed. In the meantime, samples of the coal have been taken to the laboratory. There the coal is tested for quality. The coal is carried from the crushers on belts which dump it into elevated storage bins. From these it is fed into the retorts, either "incline" or horizontal. The latter are filled with coal by means of huge traveling conveyors. These conveyors fill the retorts with coal and afterwards remove the coke. To manufacture 1,000 cu. ft. of coal-gas requires 200 pounds of bituminous coal, 10 pounds of anthracite coal and 1.6 gallons of gas-oil

It is impossible to obtain from coal a gas of more than 14 or 15 candle-power, and in order to make gas of 22 candle-power, as required by the present law, it is necessary to use gas-oil to enrich the coal-gas product. To manufacture 1,000 cu. ft. of water-gas requires 35 pounds of anthracite coal and 4.1 gallons of gas-oil. It may take four or six hours to manufacture 1,000 cu. ft. That all depends on conditions.

When the gas has been made in the retort houses and the process of carbureting with oil has been gone through, the gas passes out of the retort houses into exhausters, and from there to the condensers, after which the tar is extracted. The naphthalene and cyanogen are next removed and again the gas passes into condensers and through them to the "scrubbers," where any ammonia in the gas is recovered. Finally it goes into the purifiers, where the sulphur is taken out of the gas. These various steps completed, the gas passes on to the meters for measurement. These meters are sixteen feet in diameter and the gas, after having passed through them, finally finds its

place in the largest gas-holder in the world.

Before you have lighted your gas range or jet in Manhattan or the Bronx, a part of the gas has come to you through a tunnel under the East River from the immense Astoria holder. To do this the gas went down a shaft 277 ft., into two mains six feet in diameter—the largest in the world—and was carried over to the distributing station in the Bronx, a distance of about a mile. The tunnel is 21 ft. high and 19 ft. wide. It is 150 ft. below the bottom of the river. Added to the present high cost of gas manufacture, it costs about 25 cents a 1,000 cu. ft. to distribute gas to customers in Manhattan and the Bronx. About 7 per cent of the gas manufactured is "lost," or cannot be accounted for, as a result of "slow" meters, condensation, variation of temperature, etc. The gas companies in this city expend many thousands of dollars yearly in furnishing their customers the highest standard of service.—*Gas Logic.*

Indiana Gas Association Protests Against New Gas Standards

A protest against the recently effective gas standards promulgated by the Public Service Commission of Indiana—over which so much controversy has existed in the past, as has been explained from time to time in the JOURNAL—has just been filed with the Indiana commission by way of resolution adopted by the Indiana Gas Association.

The association requests that "promulgation of the standards be deferred until the association presents in a formal manner its specific objections thereto. The association points out that a number of paragraphs in the promulgated list of standards are at variance with recommendations made by some of the interested parties to the controversy during the long contested series of experiments and conferences out of which the promulgated standards arose. The standards, as explained previously, prescribe the sliding scale of consumer's costs in the ratio decreased heat units in the gas.

The protest was drawn up at a recent meeting, in Indianapolis, of the board of directors of the gas association.

At this same meeting resolutions were adopted recommending that all gas utilities in the state request the two Indiana senators and the thirteen representatives in the Congress to support two bills pending in the Congress for the relief of utilities. The bills, in general effect, provide preferential freight rates for utilities in summer months that the utilities may store coal and other supplies during the months when normal freight movements are not so active, and to prohibit the confiscation of coal consigned to a utility, and its reconsignment for other channels.

Texas Company Brings in Eight Wells

There were eight gas wells credited to the North Centarl Texas field for the week, the daily volume of the eight being 23,000,000 cu. ft. Gas is badly needed in Dallas, Fort Worth and other places, but the gas of recent find is quite a distance away from these cities, with no facilities for handling it, there being no gas lines so far in the newer gas districts. It is evident that if the State goes to fighting the gas companies there will be less of the product delivered through the lines, for at present prices there is no big margin in the natural gas game. When the natural gas lines are put under the jurisdiction of the Railroad Commission things will be worse than at this time, for it is evident that it takes practical men to handle the proposition and get any returns from it, for it is the most hazardous end of the industry.

Gas Plant Destroyed by Fire

The Texas Gas & Electric Company plant, Wharton, Texas, valued at $100,000, was totally destroyed by fire following an explosion. The destruction of the plant leaves the city without either a light or ice plant.

Gas Rate Increase Denied

There will be no immediate increase in the price of gas to be charged residents of Lincoln, Ill., by the Logan County Gas Company. The proposed ne wschedule has been suspended to September 25, by order of the State Utilities Commission.

Resolutions of National Committee on Natural Gas Conservation to Be Adopted at the June Meeting

A very important meeting of the Governors of natural gas using states, Public Service Commissioners and other representatives of the public in connection with a meeting of the National Committee on Natural Gas Conservation, has been called by the Secretary of the Interior for Friday, June 11, in the Auditorium of the New Interior Building at Washington, D. C., for the purpose of going into details of the committee's conclusions in the interest of natural gas conservation which is now occupying the thoughts of men high up in the industry and the government.

John Barton Payne, Secretary of the Interior, has written a letter to the Governors of the fifteen natural gas using states, urging them to meet with the committee and receive from his hands the final resolutions as adopted by the National Committee after six months work, looking to accomplishing very momentous and definite results along the line of gas saving and economy.

The Bureau of Mines, with the new director, F. G. Cottrell, at the helm, has also taken up the matter of having a thoroughly representative gathering of men in the industry and public representatives such as public service commissioners, and he has sent out letters to the committee asking that they meet early in the day of the open meeting called by Secretary Payne, at which time a discussion of the tentative resolutions passed at the last meeting of the National Committee on Natural Gas Conservation will be taken up and appropriate action taken on each. If changes are made in the original resolutions, then the Governors and their representatives can be made acquainted with these changes and the reasons therefor.

The Governors of the natural gas using states are taking a keen interest in the movement for the saving of gas, and it is expected that every one of the fifteen states will be represented at the Washington meeting on June 11th. The acting director's letter to Governor James M. Cox, of Ohio, stated that his state was the largest gas-consuming state in the Union, over five hundred towns being dependent on the natural fuel, and that means three-fourths of the

population of the state. As a very large proportion of the gas is imported from West Virginia, an interstate study of the problem is imperative. As to a crisis in the natural gas industry, this is not debatable, it is an accepted fact, and the question is now to get proper relief. One of the big features of the meeting will be the adoption of the service of economics teachers, proper equipment, etc., insuring the correct use of gas.

Ruling of Indiana Public Service Commission on the Question of Gas Main Extension

The troublesome old question, under the Indiana public service commission law, of the jurisdiction of municipalities or the commission in cases involving gas main extensions again has been passed on definitely by the Indiana Public Service Commission, in an opinion written by the Indiana Commission in a case brought by the City of Laporte. The commission dismissed, for want of jurisdiction, the city's petition that the commission require the Laporte Gas & Electric Company to show cause why the company fails to serve all the citizens of Laporte.

The commission ruled that if the City of Laporte desires the relief sought, it may, by ordinance, or resolution, order and direct the Laporte Gas & Electric Company to make the desired additions and extensions, and the opinion continues, "that if the company believes the requirements unreasonable it may appeal to the commission."

Paul P. Haynes, the commissioner who wrote the ruling, says he had in mind the laying down of a definite policy that the entire commission in passing on his proposal might adopt as its fixed one regarding the troublesome question of the extensions and additions problem. The order, in part, follows:

"The commission has no authority under Section 73 of the Public Service Commission Act to assume original jurisdiction over additions and extensions of public utilities, and its jurisdiction in the matter is confined to a review on appeal, under Section 110, of the orders of municipal councils requiring extensions, or the failure of municipal councils to permit extensions prayed for by the utility."

The order then goes on to relate how the City of Laporte complained to the commission that the Laporte Gas & Electric Company has not provided gas or electric service to many of its citizens, and how the city petitioned the commission to order the company to do so. Then the order directs attention to Section 110 of the Public Service Commission Act relating to the power of the commission in such affairs, and states:

"It clearly appears that it was the intention of the legislature to give municipal councils original jurisdiction to require public utilities to make additions and extensions. Municipal councils have also authority to provide a penalty for the failure of utilities to comply with ordinances or resolutions respecting additions or extensions.

"These provisions of the law appear to the commission not only to be wise and expedient, but entirely in keeping with the recognized principle that cities should have a large measure of control over their local affairs. The legislature doubtless assumed that this original jurisdiction and control would be exercised by the municipal councils with reason, discrimination and regard for the welfare of the municipality, as well as the economic, financial and other limitations under which utilities are required to operate.

"Appellate jurisdiction was conferred on the Public Service Commission as a safeguard against unreasonable requirements on the part of municipalities. There can be no question that cities have original jurisdiction to require utilities to make extensions and additions, and that any ordinance or resolution requiring additions or extensions is prima facie reasonable. On appeal to the commission the burden is on the utility to show the unreasonableness of any such ordinance or resolution."

The order refers to the word "service," as used in Section 73 of the Public Service Commission Act, and in its connection with the authority of the commission over a utility and states that "the commission is advised by the attorney-general that the term 'service' used in its broadest sense is not broad enough to include extensions of the lines of public utilities." The order contains a full discussion of the entire question that thus often arises in utility-municipality wrangles and then concludes:

"This conclusion is also in harmony with the spirit and purpose of the act, since control in the last resort is vested in the commission, but individual controversies over extensions are left to municipal councils which are doubtless more familiar with local needs and can formulate and enforce a consistent local policy as to extensions.

"From the point of view of public policy it would be highly undesirable for the commission, from time to time, in the first instance, to interfere with the carrying out a consistent local policy in this matter. It should confine its attention to the appellate duties conferred upon it by Section 110, after the municipal council has ordered, or has refused to permit, extensions. Municipal councils have full power under Section 110, to protect the interests of the public desiring extensions, and should exercise this power and meet this duty squarely. In case their orders are appealed from as unreasonable, or their failure, if any, to permit extensions is alleged to be against the public interest, the power and duty of the commission begins."

The order will be given wide circulation among the utility companies of the State, according to the commission, so that its definite policy with regard to the question involved will become known both to the utility managers of the state and to the municipal officers, who deal with utility control within the municipalities.

Fort Atkinson to Have Municipal Gas Plant

The city of Fort Atkinson, Wis., will, by a vote of two to one recently taken, purchase the Fort Atkinson Gas Company utility and will operate it together with the municipal water and electric plants. New equipment will be added to take care of the city's present requirements for this service.

THE NEWTON & WATERTOWN GAS LIGHT COMPANY, a subsidiary of the Massachusetts Gas Companies, has received permission of the Public Utilities to issue 6,500 additional shares, $100 par. The company asked approval for 6,500 shares. The proceeds will provide funds for payment for additions and improvements to the plant already made.

National Electric Light Association Ithaca Section Holds Annual Banquet

The Ithaca Section of the National Electric Light Association, which is composed of the officers and employees of the Ithaca, Cortland, Norwich and Oneonta plants of the New York State Gas & Electric Corporation, the Standard Light, Heat & Power Company, the Ovid Electric Company and the Van Wort Gas Light Company, representing properties in central New York and Ohio, owned and operated by the Associated Gas & Electric Company and the J. G. White Management Corporation, held its annual banquet on Friday evening, May 21.

The banquet was thoroughly enjoyed by all present and was one of the most successful affairs ever held by the local organization. Over fifty employees of the local Ithaca Gas & Electric plant were present, while the Cortland, Norwich, Oneonta, Sidney and Groton plants were also represented. Instructive and witty talks, songs and music made the evening a very pleasant and long to be remembered one.

Honorable E. H. Bostwick, attorney for the company, was the toastmaster. Mr. J. H. Pardee, president of the J. G. White Management Corporation, and also president of the American Railway Association, was the principal speaker, his address, which was illustrated, covered a recent inspection trip made by him to the Philippine Islands of the properties owned and operated by the J. G. White Companies. Mr. Pardee's address was very interesting, showing as it did, the tremendous international scope of the activities of the J. G. White Companies. Important construction projects have been carried out by the White organization in practically every civilized country of the globe; especially is this true in the Philippine Islands, where the efforts of this organization have played an important part in the upbuilding of that wonderful country whose slogan is "opportunity."

Mr. S. J. Magee, vice-president of the New York State Gas & Electric Corporation was the second speaker, delivering a very little talk, which was very much enjoyed. He also spoke of the national character of the White organization, owning and operating, as it does, numerous properties throughout this country; also referred to the White policies which permeate all the properties and which are as much a part of each property as is the gas holder a part of the gas plant. These policies are briefly outlined as Service, Efficiency and Courtesy.

Then followed responses by the superintendents of the various plants, heads of departments, etc.

Laporte G. & E. Granted Increased Rates

The Public Service Commission of Indiana has just authorized the Laporte Gas & Electric Company, of Laporte, Ind., to increase its gas rates from a schedule, graduated from $1.35 to 95 cents a 1,000 cu. ft., to a new schedule, graduated from $1.65 to $1.15 a 1,000 cu. ft. These charges are net. The new schedule, the commission pointed out, is aimed to produce an 8 per cent return on a total valuation of $360,000. The commission said, it arrived at the valuation after considering not only the original cost of the plant, but the cost of reproduction at present prices. The commission also took a forward stand in utility regulation, when it allowed, without diminution, the full valuation of new work done under present price levels. The commission also included a going value of $30,000.

Beacon Oil Co. Constructing New Refinery

The Beacon Oil Company, in which Massachusetts Gas Companies has a dominant interest, commenced construction of a 10,000 barrel refinery at Everett, Mass., last August, and it is expected that the refinery will be in operation the latter part of this month. Its crude oil requirements are assured by a contract covering a period of years which the company has signed with the Atlantic Gulf Oil Corporation, a subsidiary of the Atlantic, Gulf & West Indies Steamship Lines.

THE WEST BOSTON GAS COMPANY has asked the State Department of Public Utilities for permission to increase from 65 cents to 80 cents its charge per 1,000 cu. ft. to the Marlboro-Hudson Gas Company, Marlboro, Mass. Increased cost of fuel and labor is the reason given for the request.

Personal Notes

S. J. ROBERTS, formerly of Elyria, Ohio, has been appointed manager of the new business department of the Bartlesville Gas & Electric Company, Bartlesville, Okla. He succeeds G. B. Barnett, who left June 1 to become manager of the new business department of the Empire District Electric Company, Joplin, Mo. Mr. Roberts has been with the Lorain County Electric Company, Elyria, a part of the Doherty organization, for three years.

WILLIAM LAIRD BROWN, M.E., of Philadelphia, U. S. A., representing American engineering interests, is now in London conferring with British manufacturing, importing and banking houses to arrange the working procedure for direct representation of English buyers in the American market. On account of the difficulties often attending negotiations by letter and of the delays of transportation, some British and Continental interests have found a material advantage in directing and expediting delivery of their American purchases through a representative organization on the ground. Upon consulting the initial stages of his work here, Mr. Brown will go to Edinburgh and later to France and Italy to adjust complications in transactions arising out of war conditions. He will subsequently return to England. Mr Brown is associated with the organization of Kelly, Cooke & Company, consulting engineers of Philadelphia and New York. It may be of interest to note that this firm was called on by the United States Government during the war to correct and improve transportation conditions at all shipyards under contract with the U. S. Shipping Board. Mr. Charles B. Cooke of the firm assumed personal charge of this work as Chief Engineer and Assistant Manager of the Transportation and Housing Division of the Emergency Fleet Corporation, which was the Shipping Board's construction arm. Operations of this Division were carried through on a large scale during the war period, its expenditures being upwards of $90,000,000 in connection with transportation and housing facilities, planned and constructed

under its supervision as an adjunct to the emergency ship building program. This firm is also known to the American gas industry through the contributions of its membership to the solution of some of its major financial-engineering and economic problems. Their work in this field has been the subject of special editorials in the AMERICAN GAS ENGINEERING JOURNAL.

CHARLES A. VOLZ has been appointed Chief of the Division of Light, Heat and Power, New York State Public Service Commission, Second District. Mr. Volz is a graduate of Cornell University, 1911, and has had wide experience with public utility properties. During the world war, he served as a 1st Lieutenant with the 302nd Engineers, 77th Division, and later as a Captain in the Engineer Officer's Training School, Camp Humphreys, Va.

ROBERT H. MCCOLL, in charge of Credit and Collection Department of the Public Service Company of Northern Illinois in Evanston, Ill., died suddenly May 23, aged 53 years. He was secretary-treasurer of the Northwestern Gas Light & Coke Company and when that concern was merged into the Public Service Company in 1913 he came into the employ of the latter. His sterling, manly qualities made him a most efficient and valued employee and gained for him the respect and affection of his associates.

Publicity Section of A. G. A. Is Active

The Publicity Section of the American Gas Association is actively pushing a general propaganda both by advertising and in the publication of articles dealing with various phases of the industry. The advertisements which are scheduled to appear early cover such subjects as the accuracy of the gas meter, the conservation of natural resources with special emphasis laid on oil and coal as the questions involved affect gas making. Numerous reading articles have been prepared and publication of these is assured in magazines of national circulation.

The Section is arranging for the co-operation of a great many gas companies in the work.

Gas Oil Costs Allowed as Basis of Increased Rate Scale

The Public Utilities Commission of the District of Columbia has granted the petition of the local gaslight company for higher gas rates. The chief cause given by Howard Reeside, president of the Washington Gas Light Company as warranting the requested increase in rates on gas was the ever increasing prices and scarcity of oil used in its manufacture. The company asked for a sliding scale of rates that would go up or down according to the cost of gas oil, with a basic rate of $1.08 per 1,000 cu. ft. of gas with oil at 7.5 cents per gallon, and an increase of 4 cents on gas for every cent increase in the price of oil. The proposed sliding scale plan was rejected by the Commission and a flat rate of $1.25 fixed, to apply from the last reading of the meters, the latter part of May.

Illinois Gas Association Committee at Work

Officers of the Illinois Gas Association say that the various committees appointed for the year 1920 will be urged to go deeply as possible into the subjects assigned them. Last month the important committee on public policy whose membership includes representatives of the two other State utility associations and whose work is implied in its name, had a meeting with the Public Utility Commission. This is preliminary to other meetings to be held at which proper rates and other subjects vital to the utilities will be discussed. A new committee has been appointed to take charge of arrangements for the 1921 meeting which will be a joint affair of the Illinois Gas Association and the two other associations before referred to.

Plan Water Gas Plant for Portland, Ind.

At the regular meeting of the Commercial Association of Portland, Ind., Mr. Goodrich, manager of the Union Heat, Light & Power Company, laid out plans for the immediate installation of a water process artificial gas plant at Winchester, Ind., for the purpose of serving that city. Union City and Portland at the same rate. Natural gas in this vicinity is gone and cannot be relied upon, only as an auxiliary supply to be mixed with the artificial product.

Contracts Awarded

THE GAS MACHINERY COMPANY, of Cleveland, Ohio, is under contract to erect a nine-foot double superheater carbureted water gas apparatus, to be equipped with complete hydraulically operated machinery, in the plant of the Peoples, Power Company, Moline, Ill. The gas company is going to build an addition to their present generator house to take care of the new water gas apparatus and auxiliary equipment.

THE GAS MACHINERY COMPANY, of Cleveland, Ohio, has been awarded a contract by the City of Danville, Va., for a set of six-foot carbureted water gas appartus to be installed in the gas plant as an adjunct to their present coal gas plant. This new water gas set will serve to take care of the increased demand for gas in Danville and enable Mr. Frank Talbott, who is in charge of the Public Utilities, to continue giving the same good service that his consumers have received in the past.

THE GAS MACHINERY COMPANY, of Cleveland, Ohio, will install a new five-foot set of carbureted water gas apparatus in the plant of the Anderson Gas & Utilities Company, Anderson, S. C. This new set will be installed in the present generator building, alongside of the preesnt water gas set, and the new water gas set will be complete with autxiliary equipment.

THE GAS MACHINERY COMPANY, of Cleveland, Ohio, have contracted for the new four-foot water gas set and auxiliary equipment, which will be intsalled in the complete new gas plant, which is to be built in the City of Marshfield, Wis. The new gas works will be built complete by the Public Service Construction Company of Minneapolis, Minn.

Gas Notes Renewed

The Mildland Counties Public Service Corporation has received authorization from the Railroad Commission to renew for a term not to exceed one year notes aggregating $95,000, held by the Wells Fargo Nevada National Bank and several Southern California banks.

Gas Company Wants New Rate Increase

The Utica Gas & Electric Co., Utica, N. Y., has petitioned the Public Service Commission at Albany to have the commission modify its recent order and to permit the company to add 25 cents on each step of its existing schedule, or, as an alternative proposition, to permit the company to charge a 50 cent service charge and thereupon eliminate the exising 50 cent minimum charge.

The new rate, when determined by the commission, is proposed to become effective July 1, 1920.

The new schedule will be effective in the city of Utica and all surrounding towns within Oneida County, and also includes the town and village of Frankfort, N. Y.

The uncertainty of the future of the company's gas oil supply, due to the increasing use of oil for automobiles, trucks, ocean liners, etc., and the consequent increased price which the company will have to pay, after July 1, amounting to 110 per cent over the present price, together with increases in the cost of coal, labor and all other elements, are ascribed by the company as a reason for the necessary increased prices to the consumer.

In addition, the company states that in order to meet the demand of its prospective customers for gas service, it is essential to continue its present liberal policy in connection with the extension of its gas mains and services, due to the growth and development of the city and surrounding territory.

It is stated in the company's petition that the existing rates do not earn any reserve which can be devoted to this purpose.

By the proposed service charge of 50 cents a month, the company would charge each customer the amount for each gas meter. Such a charge is made now if customers fail to use up to a certain amount of gas, but if that part of the new schedule should go into effect relating to the service charge, all customers would pay 50 cents per month in addition to the price of gas. According to the petition, permission to do this is asked only if the Public Service Commission should not grant the requested increase of 25 cents per 1,000 ft. of gas.

Proposed New Method of Paying for Gas

Not long ago the system of paying for coal, according to the heat content, was inaugurated, and is used by many firms which are compelled to buy in quantities. Now it is proposed to buy gas in the same manner. It has been suggested by Sir Auckland Geddes, the English food commissioner. The consumer will be presented with a bill for so many heat units instead of so many cubic feet. The meter will continue to register cubic feet, but the consumer's bill will be rendered in terms of "gas units." The gas undertaking will be called upon to show what is the calorific value of the gas it supplies, and by multiplying the cubic feet registered on the meter by the calorific value the number of units to be charged for will be arrived at.

Gas consumers may be puzzled at first by the new method of charging, but there is very little mystery in it. A British thermal unit (B.t.u.) may be described as the quantity of heat required to raise one pound of water one degree Fahrenheit. A gallon of water weighs 10 pounds. It follows that when one puts the tea kettle on to boil, should it contain two pints of water to bring the water from an average of 60 degrees Fahrenheit to the boiling point of 212 degrees Fahrenheit one must use 380 B.t.u. It is proposed that the new "gas unit" will contain 100,000 B.t.u., so that one gas unit will contain sufficient heat to boil 260 such kettles of water (supposing there is no waste of heat in the operation).

Columbia Gas Earnings Hold Up

Favorable results noted in the operations of the Columbia Gas & Electric Company, Huntington, W. Va., in the first quarter of 1920 continued during April, the gross receipts in that month showing an expansion of $238,196, or nearly 24 per cent over those in the like period a year ago. The total income was $191,351 larger, at $877,545; and the balance after fixed charges amounted to $458,526, a gain of $174,081, or 61 per cent as compared with April, 1919. The net profits for the four months ended with April were $2,107,907, equivalent to more than 4 per cent on the $50,000,000 of capital stock, or more than 12 per cent per annum. As dividends of only 5 per cent per annum are paid at present on the stock, the expectations that a higher rate may be established at the next meeting of the directors does not appear unreasonable in view of the large earnings which are being experienced by the corporation. In April the fixed charges were earned about nine times over and for the four months' period they were earned about ten times. The largest earnings of the company are returned in the winter months owing to the seasonal conditions to which they are subject.

Syndicate to Offer Ohio Cities Gas Notes

A syndicate headed by the Guaranty Trust Company, William A. Read & Company and the Central Trust Company of Chicago has been formed to make a public offering of $10,000,000 Ohio Cities Gas 7 per cent serial notes, convertible into common stock. This issue will constitute the only funded debt of the company, which is one of the six largest oil companies in the country.

Net operating earnings, after depreciation, were considerably over $11,000,000 for each of the past three years, which is more than the face amount of the notes to be issued.

The present market value of the preferred and common stocks following the notes is about $75,000,000 and it is estimated that the oil properties of this company alone could be sold for $100,000,000.

Court Postpones Gas Rebate Payment

Justice Tierney in the Supreme Court in Manhattan has issued an order directing the Kings County Lighting Company of Brooklyn, N. Y., to file with the court a list of the consumers, showing the amount of money each is entitled to receive as a refund in view of the recent decision that the company was entitled to charge only 80 cents for gas instead of 95 cents.

At the same time Justice Tierney handed down a decision postponing the payment of the rebates to Brooklyn gas consumers. The rebates amount to $600,000.

New Natural Gas Field Opened in Pennsylvania

In the Eastern field the main excitement in natural gas is centered around McKeesport and Versailles, just out of Pittsburgh, Pa. Never before in the history of drilling for natural gas has there been such a rush and excitement as that occasioned by the field opened some months ago in the vicinity of McKeesport, Pa. No attention is being paid to where the wells are drilled, and the majority of the work is done by stock companies that have been formed and capitalized overnight with a sufficient amount of money to sink a well, and lots just large enough to hold a standard drilling rig have been drilled one after the other down Snake Hollow, and monster gassers were found with most wonderful rock pressure, but the pressure and volume is declining so rapidly that many of the wells are worthless after a few weeks to a gas line. More wells have been drilled in a small area around McKeesport for natural gas than in any other known field in the hunt for the same product. It was thought a few years ago that the Cleveland field in Ohio was closely drilled, but it has no comparison to the development that is taking place in the McKeesport district. More wells were drilled in the little Pennsylvania village and surroundings in a few months than was drilled altogether in the Cleveland district in three years. It is said that the McKeesport gas field was found by a fluke. Many years ago the same territory was tested out and abandoned as worthless, until recently some parties concluded to test the territory out for oil, with a result that a monster gasser was brought in. Then the rush started, and has been busy now for over a year. The field is reported to have a length of something like forty miles and the width is not as yet known, and had the field been drilled by real natural gas men more caution would have been used in the drilling and wells would have been drilled a greater distance apart to assure a steady supply of gas; but as it is the gas is coming in and the producing rocks being exhausted so rapidly that by the arrival of the coming winter, when the gas is most needed, possibly there will not be enough left to make a showing of flame. According to reports there are nearly as many wells drilling in the new gas belt as in all other parts of Pennsylvania at this time.

Big Expansion in House Heating by Gas Expected Next Year

The winter of 1920-21 it is believed will witness a considerable expansion in house heating service wherein gas is used as fuel. To secure the best results specially designed gas boilers are essential. The popularity of the house heating by gas idea is such throughout the country that difficulty was experienced in 1919 in obtaining deliveries of these boilers from manufacturers. Their facilities have been improved and no such trouble, it is stated, will be noted in 1920.

An engineering authority sums up the case of gas in house heating thus: A ton of the best anthracite coal contains 28,000,000 heat units. In the ordinary domestic plant the losses made by radiation, imperfect combustion and in the flues are such that not over 30 per cent of the heat units in a ton of anthracite can be diverted to the useful work of heating the house. Gas burned in a good gas boiler realizes easily an efficiency much over 60 per cent. Frequently the figure is 80 per cent. Reduced to terms of fuels this means that to obtain the heating values in 50,000 cu. ft. of gas two or more tons of anthracite coal must be burned. The charges attached to the use of coal, including the care of the heating plant, the removal of ashes, the damages done to the house and its contents by dust, dirt and soot amounting in the aggregate to a considerable sum appear as a credit when gas is burned, because all such charges are absent. Probably the sum is sufficient to overcome the apparent difference in its cost compared with coal. The Committee of the American Gas Association making a wide investigation of the subject of house heating by gas is coming into possession of figures of cost which it is expected may be arranged to constitute a working table.

The Boiler Code Committee of the American Society of Mechanical Engineers plans shortly to undertake the preparation of a code for miniature boilers. Presumably this will include gas-fired boilers of the type which has been brought into extensive use by gas companies.

Under the procedure which now governs the leading engineering societies in the preparation of codes and standards, the American Gas Association has requested the American Engineering Standards Committee to designate the former as one of the sponsor bodies for the preparation of the miniature boiler code, in so far as it may have bearing upon or relate to gas-fired boilers.

Southwestern Gas Company Granted Increase

Southwestern Gas Company, which manufactures and sells gas to 350 consumers in Hemet and San Jacinto, Cal., has been authorized by the State Railroad Commission to increase its charges for gas.

The new rates are designed to meet added costs of production and distribution. An increase in the company's gross revenue of $3,775, or 55 cents per 1,000 cu. ft. of gas sold, will be required to meet the increase estimated at $6,610 more than 1919, according to the commission, which finds $41,650 a reasonable rate basis.

Gas Supply Threatened

Cincinnati, Ohio, will lose most of its natural gas supply if the U. S. Supreme Court approves the Steptoe act, which prevents West Virginia gas from being piped into other states.

In the opinion of officials of the Union Gas & Electric Company, however, the law will be defeated in the courts.

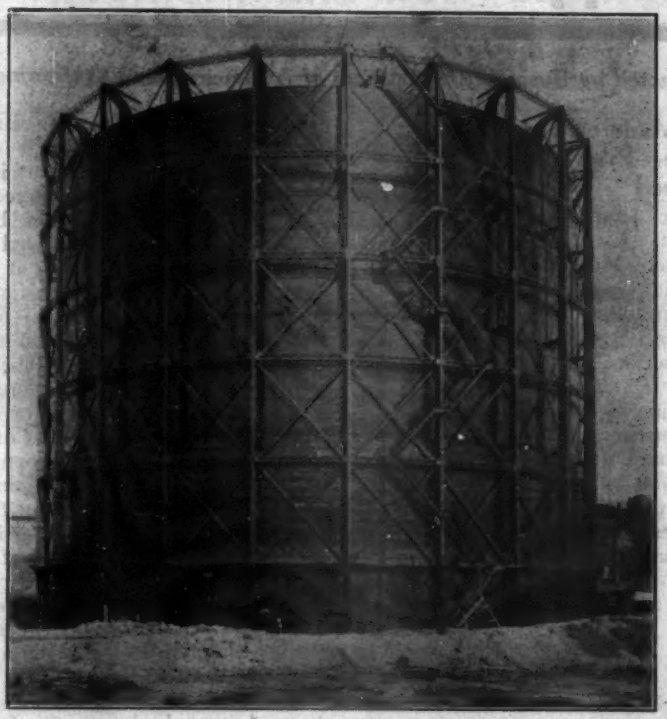
Most of Cincinnati's gas supply comes from West Virginia. The Steptoe act was passed for the purpose of conserving the West Virginia gas supply for the benefit of West Virginia.

If sustained by the Supreme Court the Columbia Gas & Electric Company, which supplies the Union Gas & Electric Company with natural gas, would be obliged to sell its product only in West Virginia.

Pennsylvania and Ohio gas companies are engaged in a joint attack on the law and hearings now are being held before a United States commissioner at Pittsburgh.

RITER-CONLEY CO.

PITTSBURGH, PA.



PURIFYING BOXES

STEEL TANKS

BUILDERS OF

TWENTY YEARS EXPERIENCE **GAS HOLDERS** HAS TAUGHT US HOW

STEEL CONSTRUCTION OF ALL KINDS

Philadelphia Washington Pottstown New York Detroit Boston Chicago Syracuse Cincinnati San Francisco

You adopt improved machinery and systems. Why not use better meters,

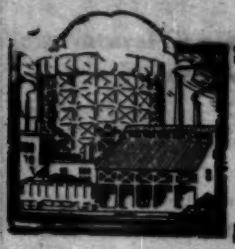
SUPERIOR METERS

Although standard type, are built stronger and embody many improvements that assure Better Service.

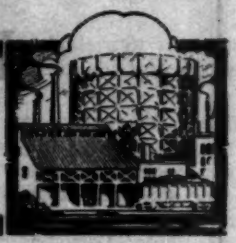
Write for illustrated Booklets and get our quotations. They will interest you.

Superior Meter Co. **Bush Terminal, Brooklyn, N. Y.**

Manufacturers of Provers, Syphon Gauges, Portable Test Meters, Oxygen, Hydrogen and Acetylene Wet Meters, High Pressure Flow Meters, All Kinds of Gas Apparatus and Calorimeters.



With The Equipment & Appliance Manufacturers



Conducted by Business Department of American Gas Engineering Journal

Cast Iron Pipe Made with Electric Furnace—Process Described

The American Cast Iron Pipe Company, Birmingham, Ala., announce a new product—McWane Prepared Joint Electric Cast Iron Pipe, a method of manufacture they have been experimenting on for five years, and which is described in the March Number of *Pipe Progress:*

The iron for this pipe is superheated in an electric furnace. Experiments have shown that uniformly high temperature iron was the secret of making light-weight pipe to withstand the same pressures as thicker-walled pipe of the present standards. High-temperature iron can not be produced satisfactorily and dependably in cupolas. With an electric furnace, however, uniformly high-tensile strength castings were made.

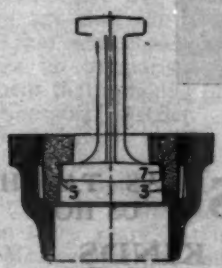


Fig. 1
CROSS SECTION OF PLUG-EXTRACTOR

Molten iron from both the cupola and the blast furnace are combined in the electric furnace to obtain the proper analysis and then the temperature of the mixture is raised to a higher degree than possible in the cupola. The high sulphur increment incident to cupola iron thus is avoided and essential metalloids usually lost in cupola practice are saved. Undesirable gases are freed from the metal by the agitation set up by the electric current, so that the chemical properties as well as the temperature of the iron are better controlled by the electric current passed through the furnace arcs by the automatic switchboard.

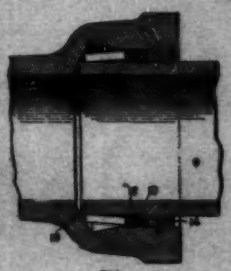


Fig. 2
CROSS SECTION COMPLETED JOINT

The result is a molten iron mixture low enough in carbon and silicon to insure high tensile strength and hot enough to make good thin-section castings. Tests of this electric iron month after month demonstrated that it is possible to make it with a tensile strength running from 30,000 to 40,000 pounds per square inch and a transverse strength on the standard 2 x 1 in. bar of 2,600 to 3,500 pounds, with a deflection of .38 to .50 of an inch. The standards for electric pipe are as follows:

Tensile strength 30,000 pounds per square inch.

Transverse strength 2,600 pounds, deflection .38 inch.

In designing new standards of weights and pressures for electric pipe the accepted engineering rules were followed. Fanning's formulae, for many years recognized as a scientific basis for design of cast iron pipe, is used in calculating the wall thickness of electric pipe for the same static pressure heads as originated by Mr. Fanning.

Hand in hand with the development of light-weight electric pipe during the past several years, the research department of the company has conducted a series af experiments looking into a simplified and more efficient joint. The McWane Prepared Joint is the result.

This is a factory-made joint. It greatly simplifies pipe line construction because to make a joint in the trench it is necessary only to insert a plain end into a bell and calk the lead. It is stated that this produces a better joint because the joint materials are placed in the bell under such conditions at the factory that all joints are uniform and because it is constructed on a new principle which makes it tighten when deflected. It does away with lead melting apparatus along the trench except a small outfit for specials and eliminates the troubles of pouring hot lead joints in wet ground.

The joint is made at the factory by standing the pipe on the spigot end and inserting a mandrel into the bell. A band of iron wedges held together by a strip of lead is first inserted around the mandrel. Two layers of square hemp, especially braided for this purpose, is next inserted and calked on top of the wedges. Then hot lead is poured into the joint and the mandrel extracted, leaving all the joint materials in place.

A concrete plug is inserted to protect the joint materials in shipment and the pipe and joint are ready for the trench. The concrete plug is so constructed that an extracting device can be inserted and the plug removed just after the pipe is rolled into the ditch.

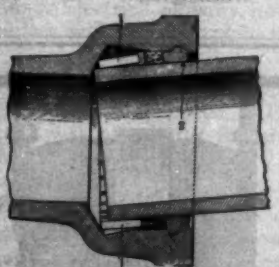


Figure 3
COMPLETE JOINT DEFLECTED

Electric pipe furnished with this joint is plain end. The principal object of the bead has been to center the spigot in the bell, a service which the McWane Prepared Joint itself automatically performs.